SUMMARY OF WATER-RESOURCES RECORDS AT PRINCIPAL MEASUREMENT SITES IN THE GENESEE RIVER BASIN THROUGH 1963

By
Bruce K. Gilbert and John C. Kammerer

Prepared by
UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
in cooperation with
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Cover photo-
Middle and Upper Falls of the Genesee River
in Letchworth State Park, New York.
-by Nicholas Dovolos, Perry, N.Y.

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SUMMARY OF WATER-RESOURCES RECORDS AT PRINCIPAL MEASUREMENT SITES IN THE GENESEE RIVER BASIN, THROUGH 1963

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ABSTRACT

This report is a tabular summary of more than half a century of water measurements (mainly streamflow) in the Genesee River basin by the U.S. Geological Survey, usually in cooperation with State and other Federal agencies. The range in streamflow is from less than 1 cfs (cubic foot per second) during dry-weather periods on five tributaries measured, to a flood flow on the Genesee River itself of more than 55,000 cfs, near Mount Morris on May 17, 1916. The average flow of the Genesee River at Rochester is 2,738 cfs, equal to a basin-wide runoff of 1.1 cfs per square mile, or 15 inches of water annually.

The chemical quality of streams in the basin varies widely in time and from place to place, generally being more highly mineralized in downstream areas than in upstream areas. The average dissolved-solids content of the Genesee River during water year 1955 was 158 ppm (parts per million) at Scio and 349 ppm at Rochester.

Ground-water levels measured in three wells for more than ten years, show no long-term decline of the water table. Generally, water levels are highest in the spring and lowest in the late summer or fall.

INTRODUCTION

This is a water fact report. The water facts are mainly about the Genesee River and some of its tributaries. The Genesee is the fourth largest river basin in New York State, some 2,400 square miles in area, plus an additional 100 square miles in Pennsylvania. The river is 144 miles long, from its headwaters in the hills of Potter County, Pennsylvania, northward to its mouth on Lake Ontario at Rochester, in western New York. Figure 1 shows the location and names of some of the principal streams in the basin.

The WHY of this report

A study is being made of the water resources of the Genesee River basin by a joint group of State and Federal agencies under authorizations of both the New York Legislature and the U.S. Congress. The goal is to prepare plans and recommendations for multi-purpose water development and management for the benefit of the people living and working in the river basin.

One of the principal "inheritances" of the new study is a wealth of long-term water records already available. However, the records are not available in a single publication, nor as a whole even in most libraries, although many libraries have books containing some of the records.

During the past 60 years, more than 150,000 measurements have been made in streams and wells in the Genesee River basin, mainly by the U.S. Geological Survey in cooperation with State and other Federal agencies. The full detailed information has been made available to the public, usually for a single year at a time, in 70 different publications. On the following pages this "mountain" of scattered information has been summarized into some 2,000 water facts concerning primarily 16 measurement sites on streams and 3 sites at wells.

This brief report is the first of its kind in the basin to identify by a map (fig. 1), tables, and a bibliography in a single summary the quantity and chemical quality of water at the principal sites measured periodically prior to 1964. A part of the data is appearing in published form for the first time in this report, and the detailed information upon which that part of the summary is based is not scheduled for printing for several years in some cases. However, the detailed information will be supplied in preliminary form by the U.S. Geological Survey upon request.

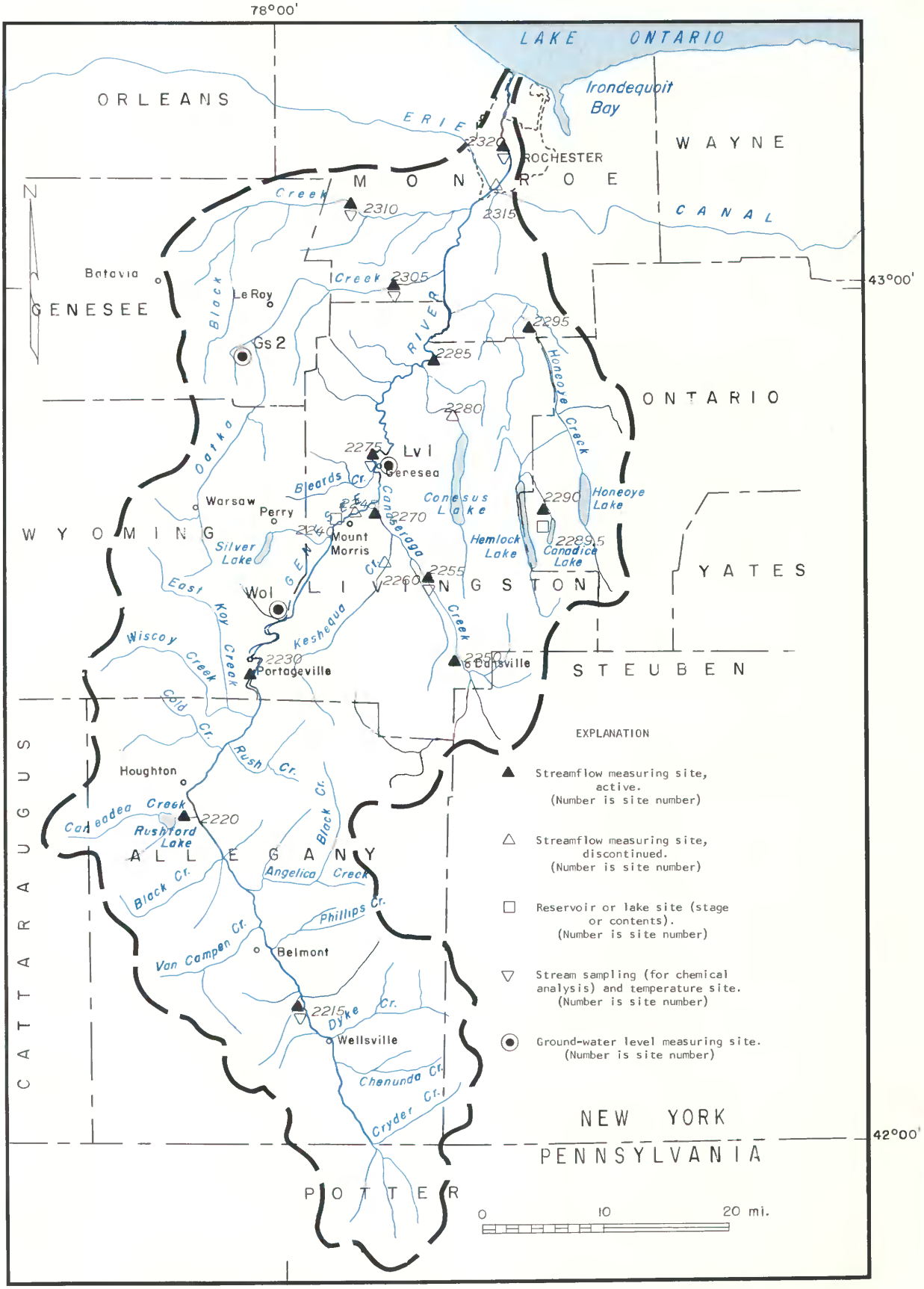

Figure 1.--Map of the Genesee River basin showing water measurement sites.

WHO might use this report ?

This report has been prepared for the use or information of anyone interested in the water resources of the Genesee River basin--be he engineer, scientist, consultant, farmer, industrialist, waterworks superintendent, college student, or other water-conscious citizen. He may be concerned only with a few of the facts presented. On the other hand, he may wish to use this summary report as a "springboard" for obtaining information in greater detail, such as for purposes of research, or to answer a practical question, or simply to satisfy his curiosity about the local occurrence of one of our most important resources.

With the above thoughts in mind, the publication sources of all tabular data in this summary report are shown either as part of the tables or in lists of publications which follow the tables. The publication lists also include the names of reports which contain additional types of information about the Genesee River basin. Many other reports could also have been listed, but those shown are probably sufficient to guide a reader into many fields of water knowledge.

Units and abbreviations

For those not familiar with Geological Survey reports on water, a list of units and abbreviations is presented below, along with a few explanatory comments. Additional information on the significance and interpretation of the quantity and chemical quality of water resources may be found in some of the publications listed at the end of this report.

°C - - degree Celsius (a centigrade scale)
cfs - - cubic foot per second, cubic feet per second
°F - - degree Fahrenheit
ft - - foot, feet
lat - - latitude
long - - longitude
mgd - - million gallons per day
p. - - page, pages
sq mi - - square mile, square miles
S.R. - - Statewide report (annual district report of the U.S. Geological Survey entitled, "Surface water records of New York")
WSP - - Water-Supply Paper of the U.S. Geological Survey (one of a series of reports)

Streamflow or discharge:

1 cfs equals about 646,000 gallons per day (0.646 mgd).
1 mgd equals about 1.55 cfs.
1 cfs per sq mi equals about 13.6 inches per year of runoff (expressed in same type of unit as inches of rainfall).
1 mgd per sq mi equals about 21.0 inches per year of runoff.
A "water year" is a 12-month period beginning October 1 and ending September 30 of the year named. (Water year 1963 ended September 30, 1963.)

Chemical analyses:

A ppm (part per million) is a weight-to-weight ratio used to express chemical concentration. For example, 1 ppm sodium dissolved in water means that in 1 million pounds of water there would be 1 pound of sodium.
1 ppm equals about 0.06 grain per gallon.
1 grain per gallon equals about 17 ppm.
A "complete" chemical analysis as referred to in this report includes all the constituents listed in tables 21-22, and occasionally some additional properties. A "partial" chemical analysis is usually limited to bicarbonate, sulfate, chloride, nitrate, hardness, specific conductance, pH, and sometimes iron.
"Hardness" is the term used to describe the soap-consuming property of water, and is a characteristic caused mainly by the presence of calcium and magnesium. The "harder" the water, the smaller the amount of suds produced by a given amount of soap or detergent; also, the greater the likelihood of "rings" forming around tubs and basins, and hard crusts forming on kettles, pans, and pipes. Water with less than 60 ppm of hardness (expressed as calcium carbonate) is generally considered "soft"; 61-120 ppm, moderately hard; 121-180 ppm, hard; and more than 180 ppm, very hard.

WHAT do the tables of statistics "say" or mean?

The water facts in this report can say many things to the person willing to look at them closely.

Let us consider just one table as an example -- table 1, which summarizes the flow of the Genesee River at Scio in Allegany County, New York:

Notice that most of the maximum flows each year occur in early spring, when spring rainfall is supplemented by the runoff from melting snow and ice. Note, too, that there are great differences in size between maximum flows and average flows, and between average flows and minimum flows. Compared to

the 47-year average discharge of 385 cfs, the maximum discharges each year are from 10 to 60 times larger. The average flow varies between 6 and 50 times the minimum-day flow. As recently as 1962, the minimum flow was 12 cfs, the third lowest of the 47 years of record.

Notice also in table 1, the frequency of high streamflows; that is, how many (or few) times a high flow occurs. If this 47-year period of record at Scio is statistically representative, and if the stream and its channel have not been regulated nor changed significantly by man, we can draw some conclusions as to the likely recurrence of the high flows. We can say, for example, that a discharge higher than 23,200 cfs will occur once in each 47-year period, higher than 19,400 cfs twice in every 47 years, higher than 17,800 cfs three times in every 47 years, etc. A long record of this kind is of considerable value to engineers. For example, the size and characteristics of the "once-in-50-year flood" (highest stage and discharge) are often used as a basis for engineering design of bridges and culverts.

If the water-supply papers listed in the second column of table 1 were consulted, we would discover that most of the minimum-flow days occurred during late summer and early fall at a time when heat, dry weather, and water use by vegetation combine their effects to return a maximum amount of water to the atmosphere by evaporation and transpiration.

If the average flow of 385 cfs is divided by the drainage area of the Genesee River at Scio of 309 square miles, we find an average runoff of 1.2 cfs per square mile, or about 16 inches annually. This compares with an average annual precipitation of about 36 inches in the same general area (from data of the U.S. Weather Bureau). Thus, of the total rain and melted snow occurring in an average year, nearly 45 percent appears in the streams and the remainder is evaporated and transpired. By comparison, for the State as a whole, about 55 percent of the precipitation becomes streamflow.

It may be seen from table 1 that in about one half of the years the minimum-day flow at Scio has been less than 20 cfs, but that in only one year did the flow fall below 10 cfs (equal to about 6.5 mgd). This latter quantity is an amount sufficient to supply (with little storage required) the water requirements of a city of 22,000 people, based on a maximum-day per capita use of 300 gallons per day for all domestic, commercial, and industrial purposes. If such a use as 6.5 mgd did occur at Scio during a time of extremely low streamflow, the river would become almost dry except for the water returned to it after use. (Actually the Scio Water District supplies water to less than 1,000 people, at an average rate of 0.4 mgd. The source of water is 1 well and 4 springs. The nearest large center of population is Wellsville, about 4 miles to the southeast and also on the Genesee River. Wellsville, with a population of about 6,000 people in 1960, draws its public water supply from the river at an average rate of about 1 mgd.)

Other stream uses for which minimum flows are a vital consideration are waste dilution, power, recreation, and navigation. In pollution-control studies, one of the most commonly used streamflow statistics in New York is the "minimum 7-day flow" which occurs once in 10 years.

STREAM DISCHARGE

The tables of stream discharge summarize the records for all streams in the Genesee River basin for which at least 3 consecutive years of record are available. Most of the records from which these tables have been compiled consist of daily stream discharges. The locations of all measuring sites are shown in figure 1.

The last column of each table contains the mean annual discharge converted to mgd so that the quantity thus expressed may be more readily compared with water-supply statistics also expressed in mgd.

Many stream-discharge measurements have been made at other places in the basin through the years and such records are also contained in the reports (water-supply papers prior to 1961, and annual Statewide reports since 1961) cited in the summary tables. Most of the reports prior to 1961 have the title, "Surface water supply of the United States, part 4, St. Lawrence River basin, 19--."

SUMMARY OF STREAM DISCHARGES

Table 1
4-2215. Genesee River at Scio, N. Y.

Location.--Lat 42°09'50", long 77°58'50", on left bank 0.4 mile upstream from Vandermark Creek and three-quarters of a mile upstream from Scio, Allegany County.

Drainage area.--309 sq mi.

Records available.--June 1916 to September 1963.

Gage.--Water-stage recorder. Datum of gage is 1,438.83 ft above mean sea level, datum of 1929. Prior to Aug. 11, 1938, staff gage and Aug. 11 to Oct. 11, 1938, water-stage recorder, at same site at datum 1.0 ft higher.

Average discharge.--47 years (1916-63), 385 cfs.

Extremes.--1916-63: Maximum discharge, 23,300 cfs (revised) Nov. 25, 1950 (gage height, 11.22 ft); minimum, 5.8 cfs Sept. 4, 1939; minimum gage height, 0.02 ft Sept. 2, 1962.

Remarks.--Chemical analyses of water collected at this site during water year 1955 are published in WSP 1400, and are summarized on page 41 of this report.

Yearly summary of stream discharge

Water year ending Sept. 30

Water year	WSP no.	Momentary maximum Discharge (cfs)	Date	Minimum day (cfs)	Mean (cfs)	Mean (mgd)
1916	434	--	--	--	--	--
1917	454	a/ 5,020	Mar. 12, 1917	26	415	268
1918	474	b/13,100	Mar. 14, 1918	34	529	342
1919	504	b/13,900	May 22, 1919	27	437	282
1920	504	8,810	Mar. 12, 1920	25	319	206
1921	524	3,810	Feb. 17, 1921	21	274	177
1922	544	4,230	June 12, 1922	34	401	259
1923	564	6,010	Mar. 4, 1923	17	271	175
1924	584	8,320	Sept. 30, 1924	20	370	239
1925	604	8,140	Feb. 11, 1925	16	303	196

a/ Corrected; this corrected figure also shown in WSP 1307.

b/ Revision of previously published figure.

Table 1
4-2215. Genesee River at Scio, N. Y. (Continued)

Yearly summary of stream discharge

Water year ending Sept. 30

Water year	WSP no.	Momentary maximum Discharge (cfs)	Momentary maximum Date	Minimum day (cfs)	Mean (cfs)	Mean (mgd)
1926	624	3,530	Mar. 23, 1926	23	317	205
1927	644	6,090	Mar. 21, 1927	16	445	288
1928	664	7,600	Dec. 1, 1927	17	602	389
1929	684	6,800	Apr. 21, 1929	20	475	307
1930	699	4,710	Feb. 25, 1930	17	366	237
1931	714	3,020	May 24, 1931	18	256	165
1932	729	3,970	Feb. 11, 1932	13	337	218
1933	744	3,410	Apr. 7, 1933	17	276	178
1934	759	4,710	Mar. 27, 1934	18	248	160
1935	784	8,560	July 8, 1935	28	400	259
1936	804	b/ 8,550	Mar. 12, 1936	19	406	262
1937	824	6,640	Jan. 25, 1937	23	441	285
1938	854	7,120	Mar. 6, 1938	19	349	226
1939	874	7,180	Feb. 20, 1939	6.9	286	185
1940	894	8,530	Mar. 31, 1940	24	395	255
1941	924	7,200	Apr. 5, 1941	15	258	167
1942	954	b/11,200	July 18, 1942	16	403	260
1943	974	8,290	Dec. 30, 1942	20	554	358
1944	1004	4,810	Mar. 17, 1944	16	285	184
1945	1034	8,390	May 18, 1945	29	536	346
1946	1054	b/17,900	May 28, 1946	64	511	330
1947	1084	b/10,800	Apr. 5, 1947	59	508	328
1948	1114	b/13,300	Mar. 22, 1948	16	384	248
1949	1144	2,690	Jan. 6, 1949	10	273	176
1950	1174	b/13,900	Mar. 28, 1950	19	367	237
1951	1207	b/23,300	Nov. 25, 1950	28	577	373
1952	1237	b/ 7,500	Mar. 11, 1952	21	479	310
1953	1277	b/ 8,750	Mar. 24, 1953	24	345	223
1954	1337	5,360	Mar. 2, 1954	16	318	206
1955	1387	b/ 6,730	Mar. 1, 1955	15	246	159
1956	1437	16,900	Mar. 8, 1956	26	597	386
1957	1507	8,240	Jan. 23, 1957	20	412	266
1958	1557	7,950	Apr. 7, 1958	24	395	255
1959	1627	19,500	Jan. 22, 1959	12	390	252
1960	1707	12,800	June 15, 1960	22	493	318

b/ Revision of previously published figure.

Table 1
4-2215. Genesee River at Scio, N. Y. (Continued)

Yearly summary of stream discharge

Water year ending Sept. 30

Water year	WSP no.	Momentary maximum Discharge (cfs)	Momentary maximum Date	Minimum day (cfs)	Mean (cfs)	Mean (mgd)
1961	S.R.	14,400	Feb. 26, 1961	16	327	211
1962	S.R.	3,590	Apr. 7, 1962	12	227	147
1963	S.R.	6,990	Mar. 27, 1963	25	281	182

Table 2
4-2220. Caneadea Creek at Caneadea, N. Y.

Location.--Lat 42°23'10", long 78°09'45", on left bank at Caneadea, Allegany County, 800 ft upstream from unnamed tributary and 0.6 mile upstream from mouth.

Drainage area.--61.5 sq mi.

Records available.--July 1949 to September 1963.

Gage.--Water-stage recorder. Datum of gage is 1,240.42 ft above mean sea level, datum of 1929, adjustment of 1943.

Average discharge.--14 years (1949-63), 87.3 cfs (adjusted for storage).

Extremes.--1949-63: Maximum discharge, 9,600 cfs June 15, 1960 (gage height, 10.74 ft), from rating curve extended above 770 cfs on basis of hydraulic study of flow over Rushford Dam; minimum, 0.7 cfs Nov. 11, 13, 1954; minimum daily, 0.8 cfs Feb. 3, 1961; minimum gage height, 1.35 ft Dec. 9, 1961.

Remarks.--Considerable regulation by Rushford Lake (capacity, 1,106,000,000 cu ft) about 2 miles above station.

Table 2
4-2220. Caneadea Creek at Caneadea, N. Y. (Continued)

Yearly summary of stream discharge

Water year ending Sept. 30

Water year	WSP no.	Momentary maximum Discharge (cfs)	Momentary maximum Date	Minimum day (cfs)	Mean (cfs)	*Adjusted mean (cfs)	*Adjusted mean (mgd)
1949	1144	--		--	--	--	--
1950	1174	1,570	Apr. 5, 1950	1.0	69.1	a/ 89.4	57.8
1951	1207	1,590	Sept. 25, 1951	2.4	111	99.2	64.1
1952	1237	1,110	Feb. 29, 1952	1.5	98.5	105	67.8
1953	1277	1,180	Sept. 14, 1953	1.2	92.7	74.6	48.2
1954	1337	1,600	Apr. 28, 1954	1.4	58.6	70.9	45.8
1955	1387	548	Dec. 17, 1954	.9	44.6	55.7	36.0
1956	1437	1,700	Oct. 15, 1955	1.0	136	136	87.9
1957	1507	1,090	May 20, 1957	2.2	90.3	90.1	58.2
1958	1557	971	Sept. 15, 1958	2.3	88.5	74.9	48.4
1959	1627	1,130	Feb. 20, 1959	1.9	93.5	87.6	56.6
1960	1707	9,600	June 15, 1960	1.4	118	123	79.5
1961	S.R.	8,690	Apr. 25, 1961	.8	83.4	83.5	54.0
1962	S.R.	796	Dec. 13, 1961	2.0	45.8	57.6	37.2
1963	S.R.	1,200	Mar. 27, 1963	.9	74.3	74.3	48.0

a/ Previously published only in WSP 1307.
* Adjusted for change in contents in Rushford Lake.

Table 3
4-2230. Genesee River at Portageville, N. Y.

Location.--Lat 42°34'10", long 78°02'45", on left bank at Portageville, Wyoming County, 300 ft downstream from small tributary, 350 ft downstream from Pennsylvania Railroad bridge, and 0.7 mile upstream from Upper Falls.

Drainage area.--982 sq mi. Prior to Oct. 1, 1946, 1,017 sq mi.

Records available.--August 1908 to September 1963. Prior to December 1945 published as "at St. Helena". Records published for both sites December 1945 to September 1950.

Gage.--Water-stage recorder since Oct. 1, 1946. Datum of gage is 1,082.60 ft above mean sea level (levels by Corps of Engineers). Prior to Aug. 24, 1911, chain gage and Aug. 24, 1911, to Sept. 30, 1946, water-stage recorder, at site 8 miles downstream at different datum. Both recorders in operation Dec. 16, 1945, to Sept. 30, 1950.

Table 3
4-2230. Genesee River at Portageville, N. Y. (Continued)

Average discharge.--55 years (1908-63), 1,218 cfs (unadjusted).

Extremes.--1908-63: Maximum discharge, 44,400 cfs May 17, 1916 (gage height, 12.81 ft, site and datum then in use); maximum gage height, 21.70 ft Mar. 7, 1956; minimum discharge, 18 cfs Oct. 5, 17, 1913 (gage height, 1.70 ft, site and datum then in use).

Remarks.--Some seasonal regulation by Rushford Lake (capacity, 1,106,000,000 cu ft) since July 1928. Diurnal fluctuation at low flow caused by powerplants.

Yearly summary of stream discharge

Water year ending Sept. 30

Water year	WSP no.	Momentary maximum Discharge (cfs)	Momentary maximum Date	Minimum day (cfs)	Mean (cfs)	Adjusted mean (cfs)	Adjusted mean (mgd)
1908	264	--		--	--	--	--
1909	264	26,300	Apr. 30, 1909	59	1,060	--	--
1910	284	30,200	Feb. 28, 1910	64	1,170	--	--
1911	304	12,600	Aug. 28, 1911	61	1,190	--	--
1912	324	22,700	Mar. 30, 1912	64	1,340	--	--
1913	354	42,800	Mar. 26, 1913	--	1,450	--	--
1914	384	23,200	Mar. 28, 1914	20	1,230	--	--
1915	404	21,400	Feb. 15, 1915	61	1,150	--	--
1916	434	44,400	May 17, 1916	77	2,040	--	--
1917	454	16,700	Mar. 12, 1917	81	1,340	--	--
1918	474	29,500	Mar. 14, 1918	91	1,280	--	--
1919	504	32,800	May 22, 1919	78	1,240	--	--
1920	504	39,700	Mar. 13, 1920	56	920	--	--
1921	524	18,100	Feb. 17, 1921	37	909	--	--
1922	544	12,600	Mar. 7, 1922	127	1,250	--	--
1923	564	16,400	Mar. 16, 1923	50	814		
1924	584	17,600	Sept.30, 1924	65	1,220	--	--
1925	604	17,500	Feb. 12, 1925	86	910	--	--
1926	624	14,800	Mar. 25, 1926	88	1,190	--	--
1927	644	15,800	May 24, 1927	70	1,410	--	--
1928	664	42,700	Dec. 1, 1927	72	1,660	--	--
1929	684	26,700	Apr. 21, 1929	71	1,490	--	--
1930	699	20,500	Feb. 26, 1930	65	1,200	--	--

Table 3

4-2230. Genesee River at Portageville, N. Y. (Continued)

Yearly summary of stream discharge

Water year ending Sept. 30

Water year	WSP no.	Momentary maximum Discharge (cfs)	Momentary maximum Date	Minimum day (cfs)	Mean (cfs)	*Adjusted mean (cfs)	*Adjusted mean (mgd)
1931	714	11,600	May 24, 1931	52	789	--	--
1932	729	14,200	Feb. 11, 1932	47	1,220	--	--
1933	744	17,200	Mar. 14, 1933	65	960	--	--
1934	759	15,200	Mar. 4, 1934	28	782	--	--
1935	784	17,400	July 9, 1935	75	1,172	--	--
1936	804	25,500	Mar. 26, 1936	36	1,148	--	--
1937	824	18,100	Jan. 25, 1937	58	1,363	--	--
1938	854	17,200	Mar. 6, 1938	80	1,052	--	--
1939	874	28,400	Feb. 20, 1939	32	1,094	--	--
1940	894	26,500	Apr. 5, 1940	77	1,336	--	--
1941	924	29,400	Apr. 6, 1941	72	1,044	--	--
1942	954	32,300	Mar. 17, 1942	86	1,183	--	--
1943	974	27,400	May 26, 1943	108	1,800	--	--
1944	1004	15,200	Mar. 17, 1944	83	969	--	--
1945	1034	24,600	Mar. 4, 1945	125	1,536	--	--
1946	1054	25,200	May 28, 1946	176	1,460	--	--
1947	1084	28,300	Apr. 6, 1947	156	1,619	--	--
1948	1114	24,100	Mar. 22, 1948	83	1,187	--	--
1949	1144	9,660	Jan. 6, 1949	73	882	--	--
1950	1174	31,900	Mar. 29, 1950	80	1,141	--	--
1951	1207	31,900	Nov. 26, 1950	82	1,679	a/1,667	1,080
1952	1237	23,200	Mar. 12, 1952	55	1,347	1,354	875
1953	1277	21,000	Mar. 24, 1953	86	1,140	1,122	725
1954	1337	15,400	Apr. 28, 1954	63	1,023	1,036	669
1955	1387	20,700	Mar. 1, 1953	48	799	810	524
1956	1437	36,100	Mar. 7, 1956	63	1,849	1,849	1,190
1957	1507	19,700	Apr. 6, 1957	76	1,289	1,288	832
1958	1557	19,300	Apr. 6, 1958	62	1,077	1,063	687
1959	1627	33,300	Jan. 22, 1959	60	1,250	1,244	804
1960	1707	27,800	Mar. 31, 1960	70	1,637	1,642	1,060
1961	S.R.	30,200	Apr. 25, 1961	66	1,147	1,147	741
1962	S.R.	12,000	Apr. 7, 1962	37	766	778	503
1963	S.R.	24,500	Mar. 27, 1963	88	790	790	511

a/ Previously published only in WSP 1727.

* Adjusted for change in contents in Rushford Lake.

Table 4

4-2240. Mount Morris Reservoir near Mount Morris, N. Y.

Location.--Lat 42°44'00", long 77°54'40", at Mount Morris Dam on Genesee River, 2-1/2 miles northwest of Mount Morris, Livingston County, 5 miles upstream from Canaseraga Creek, and 40 miles upstream from mouth.

Drainage area.--1,077 sq mi (measured by Corps of Engineers).

Records available.--January 1952 to September 1963.

Gage.--Water-stage recorder. Datum of gage is at mean sea level (levels by Corps of Engineers). Prior to Apr. 8, 1952, reference point at same site and datum.

Extremes.--1952-63: Maximum elevation, 719.4 ft Apr. 5, 1960 (contents, 215,980 acre-ft); minimum, 585.1 ft Dec. 13-15, 24, 25, 1960, Jan. 22 to Feb. 12, 1961 (contents, 626 acre-ft).

Remarks.--Reservoir is formed by a concrete gravity-type dam with overflow spillway, completed by Corps of Engineers in 1951 for flood control; first used for flood regulation on Nov. 24, 1951. Usable capacity, 337,000 acre-ft between elevations 585.0 ft (sill of conduits) and 760.0 ft (crest of spillway). Dead storage, 609 acre-ft. Floods are controlled by the operation of nine gates. Water is stored during high flows and released when downstream conditions warrant.

Cooperation.--Capacity table furnished by Corps of Engineers.

Numbers of water-supply papers containing daily elevations, contents, and changes in contents

Year	WSP	Year	WSP	Year	WSP
1952	1277	1955	1387	1958	1557
1953	1277	1956	1437	1959	1627
1954	1337	1957	1507	1960	1707

Note: Comparable data for each water year since 1960 are contained in annual open-file reports, "Surface water records of New York".

Table 5

4-2245. Genesee River at Mount Morris, N.Y.

Location.--Lat 42°44'20", long 77°52'55", at dam of Mount Morris Water Power Co. in Mount Morris, Livingston County, about 2 miles upstream from Canaseraga Creek.

Drainage area.--1,078 sq mi (revised).

Table 5
4-2245. Genesee River at Mount Morris, N. Y. (Continued)

Gage.--Staff gage. Altitude of gage is 570 ft (from topographic map).

Remarks.--Discharge over dam and wasteways and through wheels in powerplant computed by formula and wheel ratings. Diversion through mills determined at gaging station on tailrace below mills. Leakage from wasteway at head of canal and through banks, estimated as varying between 6 cfs and 40 cfs, not included in estimates of total discharge.

Records for the period September 1893 to November 1896, published in the Twentieth Annual Report, Part 4 [a/], have not been included herein because base data were not available for evaluation of them.

Yearly summary of stream discharge

Water year ending Sept. 30

Water year	WSP no	Momentary maximum Discharge (cfs)	Momentary maximum Date	Minimum day (cfs)	Mean (cfs)	Mean (mgd)
1905	244	--	--	--	--	--
1906	244	--	--	116	1,030	666
1907	244	--	--	82	1,450	937
1908	244	--	--	99	1,650	1,070
1909	264	--	--	--	--	--

a/ Twentieth Annual Report of the U.S. Geological Survey, 1898-99, published in 1899.

Table 6
4-2250. Canaseraga Creek near Dansville, N. Y.

Location.--Lat 42°33'40", long 77°42'55", on left bank just downstream from Ossian Street Bridge, half a mile downstream from Mill Creek and 1 mile west of Dansville, Livingston County.

Drainage area.--153 sq mi. October 1917 to September 1919, October 1938 to September 1940, 155 sq mi.

Records available.--July 1910 to December 1912, July 1915 to June 1917, October 1917 to September 1919 (published as "at Cumminsville"), March 1920 to September 1963. Monthly discharge only for some periods, published in WSP 1307.

Gage.--Water-stage recorder. Datum of gage is 640.00 ft above mean sea level (levels by New York State Conservation Commission). Prior to Oct. 19, 1920, staff gage at or within 1 mile of present site at various datums. Oct. 19, 1920, to Sept. 30, 1938, water-stage recorder at present site and datum, and Oct. 1, 1938, to Oct. 8, 1940, at site 0.9 mile downstream at datum 15.70 ft lower.

Table 6

4-2250. Canaseraga Creek near Dansville, N. Y. (Continued)

Average discharge.--48 years (1910-12, 1915-16, 1917-19, 1920-63), 152 cfs.

Extremes.--1910-12, 1915-63: Maximum discharge at present site, 8,830 cfs July 23, 1940 (gage height, 13.1 ft, from floodmark); maximum gage height at present site, 13.68 ft Mar. 7, 1956; maximum discharge at former site, 9,110 cfs July 23, 1940 (gage height, 9.93 ft), from rating curve extended above 2,100 cfs on basis of slope-area measurement of peak flow; minimum daily, 3 cfs Apr. 28, 1912.

Yearly summary of stream discharge

Water year ending Sept. 30

Water year	WSP no.	Momentary maximum		Minimum day	Mean	
		Discharge (cfs)	Date	(cfs)	(cfs)	(mgd)
1910	324	--	--	--	--	--
1911	324	a/ 1,880	Mar. 27, 1911 a/	10	a/135	87.2
1912	324	a/ 4,900	July 9, 1912	3	a/185	120
1913	324	--	--	--	--	--
1915	404	--	--	--	--	--
1916	434	6,600	May 16, 1916	a/32	a/277	179
1917	454	2,380	June 11, 1917	--	--	--
1918	504	3,790	Feb. 12, 1918	21	a/162	105
1919	504	6,540	May 22, 1919	21	141	91.1
1920	504	3,950	July 24, 1920	--	--	--
1921	524	1,270	Mar. 9, 1921	16	109	70.4
1922	544	3,500	Sept. 4, 1922	23	164	106
1923	604	3,570	Mar. 4, 1923	17	127	82.1
1924	604	1,830	Sept. 30, 1924	19	137	88.5
1925	604	3,240	Feb. 11, 1925	22	112	72.4
1926	624	2,100	Apr. 8, 1926	19	138	89.2
1927	644	2,600	May 24, 1927	29	171	111
1928	664	6,900	Nov. 30, 1927	19	227	147
1929	684	6,150	Apr. 21, 1929	18	198	128
1930	699	1,850	Mar. 17, 1930	15	151	97.6
1931	714	2,400	May 13, 1931	13	100	64.6
1932	729	3,350	May 9, 1932	16	138	89.2
1933	744	3,160	Mar. 14, 1933	16	110	71.1
1934	759	--	--	12	84.8	54.8
1935	784,894	8,390	July 8, 1935	14	149	96.3

a/ Previously published only in WSP 1307.

Table 6

4-2250. Canaseraga Creek near Dansville, N. Y. (Continued)

Yearly summary of stream discharge

Water year ending Sept. 30

Water year	WSP no.	Momentary maximum Discharge (cfs)	Date	Minimum day (cfs)	Mean (cfs)	Mean (mgd)
1936	804	4,240	Mar. 25, 1936	18	166	107
1937	824	2,830	June 21, 1937	17	145	93.7
1938	854	4,420	Mar. 5, 1938	16	123	79.5
1939	874	4,860	Feb. 20, 1939	16	149	96.3
1940	894	9,110	July 23, 1940	20	158	102
1941	924	5,860	Apr. 5, 1941	11	133	85.9
1942	954	8,400	Mar. 17, 1942	14	148	95.6
1943	974	7,560	May 26, 1943	25	211	136
1944	1004	4,490	Mar. 16, 1944	21	121	78.2
1945	1034	6,370	May 17, 1945	24	204	132
1946	1054	4,260	June 1, 1946	26	163	105
1947	1084	4,910	Apr. 5, 1947	32	218	141
1948	1114	6,350	Mar. 19, 1948	19	135	87.2
1949	1144	1,680	Feb. 14, 1949	16	93.8	60.6
1950	1174	7,170	Mar. 28, 1950	18	137	88.5
1951	1207	6,150	Mar. 30, 1951	21	220	142
1952	1237	3,630	Mar. 11, 1952	18	154	99.5
1953	1277	3,790	Mar. 24, 1953	24	141	91.1
1954	1337	5,240	Apr. 27, 1954	20	123	79.5
1955	1387	3,990	Mar. 1, 1955	14	100	64.6
1956	1437	4,500	Mar. 7, 1956	18	222	143
1957	1507	2,970	Apr. 6, 1957	21	161	104
1958	1557	2,910	Apr. 6, 1958	18	121	78.2
1959	1627	6,000	Jan. 22, 1959	18	147	94.9
1960	1707	5,170	Mar. 30, 1960	20	215	139
1961	S.R.	8,230	Apr. 25, 1961	15	147	95.0
1962	S.R.	1,570	Mar. 12, 1962	12	104	67.2
1963	S.R.	2,770	Mar. 17, 1963	18	112	72.4

Table 7

4-2255. Canaseraga Creek at Groveland, N. Y.

Location.--Lat 42°39'45", long 77°46'10", on left bank at downstream side of highway bridge at Groveland, Livingston County, 0.2 mile downstream from small tributary.

Drainage area.--181 sq mi.

Records available.--August 1915 to September 1916 (gage heights and discharge measurements only) and February 1917 to March 1920 (no winter records in 1917, 1918, 1920), published as "at Groveland Station"; October 1955 to September 1963.

Gage.--Water-stage recorder. Datum of gage is 565.42 ft above mean sea level (levels by Corps of Engineers). Prior to Mar. 30, 1916, inclined staff gage at site 400 ft upstream at datum about 5.42 ft lower. Mar. 30, 1916, to Mar. 31, 1920, chain gage on downstream side of bridge at practically same datum as inclined staff gage.

Average discharge.--9 years (1918-19, 1955-63), 181 cfs.

Extremes.--1917-20, 1955-63: Maximum discharge observed, 4,380 cfs May 22, 1919 (gage height, 18.05 ft); minimum, 15 cfs Sept. 9, 1962; minimum gage height, 1.96 ft Oct. 2, 5, 1955.

Remarks.--Overflow of left bank occurs upstream at extremely high stages. Water returns to channel below station. Chemical analyses of water collected at this site during water year 1961 will be published in WSP 1882, and are summarized on page 41 of this report.

Yearly summary of stream discharge

Water year ending Sept. 30

Water year	WSP no.	Momentary maximum		Minimum day	Mean	
		Discharge (cfs)	Date	(cfs)	(cfs)	(mgd)
1917	454	4,170	July 29, 1917	--	--	--
1918	474	--	--	--	--	--
1919	504	4,380	May 22, 1919	25	173	112
1920	504	--	--	--	--	--
1956	1437	3,380	Mar. 7, 1956	18	258	167
1957	1507	2,810	Apr. 6, 1957	23	202	131
1958	1557	2,880	Apr. 6, 1958	21	141	91.1
1959	1627	2,610	Apr. 2, 1959	22	175	113
1960	1707	3,800	Mar. 30, 1960	27	244	158
1961	S.R.	3,330	Apr. 25, 1961	17	179	116
1962	S.R.	2,020	Mar. 12, 1962	15	125	80.8
1963	S.R.	2,980	Mar. 17, 1963	22	134	86.6

Table 8

4-2260. Keshequa Creek at Craig Colony, Sonyea, N. Y.

Location.--Lat 42°40'55", long 77°49'45", on right bank 200 ft downstream from private bridge on grounds of Craig Colony at Sonyea, Livingston County, about 2 miles upstream from mouth.

Drainage area.--69.1 sq mi. September 1915 to October 1917, 76.5 sq mi.

Gage.--Staff gage. Altitude of gage is 600 ft (from topographic map). Prior to Dec. 31, 1912, staff or chain gage at highway bridge 200 ft upstream at different datum; Aug. 29, 1915, to Oct. 31, 1917, staff gage at site about 1 mile downstream near Delaware, Lackawanna and Western Railroad bridge at different datum.

Average discharge.--15 years (1917-32), 49.7 cfs.

Extremes.--1911-12, 1917-32: Maximum discharge, 5,940 cfs Mar. 14, 1918, May 22, 1919; minimum, about 0.1 cfs Sept. 8-21, 1932.

Year summary of stream discharge

Water year ending Sept. 30

Water year	WSP no.	Momentary maximum Discharge (cfs)	Momentary maximum Date	Minimum day (cfs)	Mean (cfs)	Mean (mgd)
1911	304,324	--	--	--	--	--
1912	324	--	--	--	--	--
1913	324	--	--	--	--	--
1915	404	--	--	--	--	--
1916	434	--	--	--	--	--
1917	454	--	--	--	--	--
1918	474	a/ 5,940	Mar. 14, 1918	0.8	58.6	37.9
1919	504	5,940	May 22, 1919	1.8	43.0	27.8
1920	504	3,310	Mar. 12, 1920	1.0	35.3	22.8
1921	524	1,410	Feb. 16, 1921	1.3	39.1	25.3
1922	544	1,840	Mar. 7, 1922	3.2	52.1	33.7
1923	564	1,780	Mar. 3, 1923	.9	35.5	22.9
1924	584	2,500	May 12, 1924	1.5	50.0	32.3
1925	604	2,000	Feb. 11, 1925	1.1	36.3	23.5
1926	624	2,160	Apr. 8, 1926	1.3	46.8	30.2
1927	644	1,990	May 9, 1927	1.5	54.7	35.4
1928	664	b/ 5,640	Nov. 17, 1927	1.8	86.8	56.1
1929	684	2,200	Apr. 21, 1929	.8	66.8	43.2
1930	699	2,330	Jan. 14, 1930	.2	54.8	35.4
1931	714	5,500	May 12, 1931	.9	33.9	21.9
1932	729	3,110	May 9, 1932	.1	51.8	33.5

a/ Corrected; this corrected figure also shown in WSP 1307.
b/ Previously published only in WSP 1307.

Table 9

4-2270. Canaseraga Creek at Shakers Crossing, N. Y.

Location.--Lat 42°44'15", long 77°50'30", on left bank at upstream side of highway bridge at Shakers Crossing, about 1 mile upstream from mouth and 1-1/2 miles northeast of Mount Morris, Livingston County.

Drainage area.--333 sq mi.

Records available.--July 1915 to September 1922 (gage heights only), November 1958 to September 1963.

Gage.--Water-stage recorder. Datum of gage is 545.30 ft above mean sea level (levels by Corps of Engineers). Prior to November 1958, at site 40 ft downstream at datum 5.30 ft lower.

Extremes.--1959-63: Maximum discharge, 4,430 cfs Apr. 26, 1961 (gage height, 12.07 ft); minimum, 16 cfs Sept. 9, 1962; minimum gage height, 2.65 ft Sept. 1, 2, 1962.
1915-22: Maximum gage height, 23.62 ft (present datum) May 17, 1916 (backwater from Genesee River).

Yearly summary of stream discharge

Water year ending Sept. 30

Water year	WSP no.	Momentary maximum Discharge (cfs)	Momentary maximum Date	Minimum day (cfs)	Mean (cfs)	Mean (mgd)
1959	1627	2,900	Apr. 2, 1959	--	--	--
1960	1707	4,350	Apr. 1, 1960	25	400	259
1961	S.R.	4,430	Apr. 26, 1961	20	304	196
1962	S.R.	1,600	Apr. 7, 1962	17	179	116
1963	S.R.	3,170	Mar. 18, 1963	25	211	136

Table 10

4-2275. Genesee River at Jones Bridge, near Mount Morris, N. Y.

Location.--Lat 42°45'55", long 77°50'25", on right bank at Jones Bridge, 1-1/2 miles downstream from Canaseraga Creek and 3-1/2 miles northeast of Mount Morris, Livingston County.

Drainage area.--1,419 sq mi.

Records available.--May 1903 to April 1906, August 1908 to April 1914, July 1915 to September 1963.

Table 10

4-2275. Genesee River at Jones Bridge, near Mount Morris, N. Y. (Continued)

Gage.--Water-stage recorder. Datum of gage is 540.00 ft above mean sea level (levels by New York State Conservation Commission). Prior to Sept. 11, 1915, chain gage on bridge at datum 2.73 ft lower.

Average discharge.--53 years (1908-13, 1915-63), 1,600 cfs (unadjusted).

Extremes.--1903-6, 1908-14, 1915-63: Maximum discharge, 55,100 cfs May 17, 1916 (gage height, 25.44 ft); minimum, 12 cfs July 23, 1955 (gage height, 0.22 ft, partially obstructed intake); minimum daily, 30 cfs Aug. 8, 1909.

Remarks.--Diurnal fluctuation at low flow caused by powerplants. Flow regulated to some extent by Rushford Lake (capacity, 1,106,000,000 cu ft) since July 1928 and, at high flows, since November 1951 by Mount Morris Reservoir (see p. 15). Chemical analyses of water collected near this site during water years 1955 and 1956 are published in WSP 1400 and 1450, and are summarized on page 41 of this report.

Yearly summary of stream discharge

Water year ending Sept. 30

Water year	WSP no.	Momentary maximum Discharge (cfs)	Date	Minimum day (cfs)	Mean (cfs)	Adjusted mean (cfs)	Adjusted mean (mgd)
1903	97	--	--	--	--	--	--
1904	129	--	--	--	--	--	--
1905	170	--	--	--	--	--	--
1906	206	--	--	--	--	--	--
1908	244	--	--	--	--	--	--
1909	264	a/24,000	May 2, 1909	30	1,440	--	--
1910	284	--	--	60	1,470	--	--
1911	304	--	--	80	1,500	--	--
1912	324	--	--	141	1,670	--	--
1913	354,1387	b/38,000	Mar. 26, 1913	58	b/1,900	--	--
1914	384	--	--	--	--	--	--
1915	404	--	--	--	--	--	--
1916	434	55,100	May 17, 1916	138	2,640	--	--
1917	454	31,800	Mar. 12, 1917	118	1,600	--	--
1918	474	a/29,000	Mar. 15, 1918	126	1,790	--	--
1919	504	32,000	May 23, 1919	187	c/1,630	--	--
1920	504	20,700	July 24, 1920	117	1,200	--	--

a/ Previously published only in WSP 1307.
b/ Revised; this revised figure also shown in WSP 1387 and 1707.
c/ Corrected; this corrected figure also shown in WSP 1307.

Table 10

4-2275. Genesee River at Jones Bridge, near Mount Morris, N. Y. (Continued)

Yearly summary of stream discharge

Water year ending Sept. 30

Water year	WSP no.	Momentary maximum Discharge (cfs)	Date	Minimum day (cfs)	Mean (cfs)	*Adjusted mean (cfs)	(mgd)
1921	524	17,900	Feb. 17, 1921	94	1,230	--	--
1922	544	14,600	Apr. 1, 1922	154	1,690	--	--
1923	564	12,200	Apr. 5, 1923	66	1,110	--	--
1924	584	20,100	Sept. 30, 1924	78	1,510	--	--
1925	604	a/26,600	Feb. 12, 1925	108	1,250	--	--
1926	624	14,500	Apr. 9, 1926	133	1,520	--	--
1927	644	16,600	May 24, 1927	58	1,840	--	--
1928	664	46,800	Dec. 1, 1927	130	2,320	--	--
1929	684	26,000	Apr. 21, 1929	137	2,020	--	--
1930	699	19,600	Feb. 26, 1930	38	1,620	--	--
1931	714	13,000	May 24, 1931	81	999	--	--
1932	729	16,000	May 10, 1932	73	1,560	--	--
1933	744	18,100	Mar. 15, 1933	108	1,240	--	--
1934	759	14,300	Mar. 5, 1934	36	972	--	--
1935	784	14,500	July 9, 1935	93	1,438	--	--
1936	804	26,300	Mar. 26, 1936	53	1,589	--	--
1937	824	18,000	Jan. 25, 1937	89	1,745	--	--
1938	854	18,000	Mar. 6, 1938	85	1,380	--	--
1939	874	25,500	Feb. 21, 1939	46	1,358	--	--
1940	894	29,600	Apr. 1, 1940	110	1,703	--	--
1941	924	24,600	Apr. 6, 1941	73	1,280	--	--
1942	954	32,400	Mar. 18, 1942	93	1,503	--	--
1943	974	27,800	Dec. 31, 1942	78	2,333	--	--
1944	1004	17,000	Mar. 17, 1944	81	1,251	--	--
1945	1034	22,300	Mar. 4, 1945	127	1,974	--	--
1946	1054	23,100	May 29, 1946	235	1,862	--	--
1947	1084	30,600	Apr. 6, 1947	205	2,132	--	--
1948	1114	27,700	Mar. 22, 1948	94	1,566	--	--
1949	1144	a/12,800	Jan. 6, 1949	56	1,086	--	--
1950	1174	45,400	Mar. 29, 1950	107	1,465	--	--
1951	1207	26,000	Nov. 27, 1950	100	2,224	d/2,212	1,430
1952	1237,1277	9,500	Apr. 6, 1952	84	1,764	1,772	1,150
1953	1277	10,800	Mar. 27, 1953	89	1,455	1,442	932
1954	1337	13,800	Apr. 28, 1954	61	1,409	1,420	918
1955	1387,1437	12,800	Mar. 6, 1955	43	1,078	1,090	704

a/ Previously published only in WSP 1307.

d/ Previously published only in WSP 1727.

* Adjusted for change in contents in Rushford Lake and Mount Morris Reservoir.

Table 10

4-2275. Genesee River at Jones Bridge, near Mount Morris, N. Y. (Continued)

Yearly summary of stream discharge

Water year ending Sept. 30

Water year	WSP no.	Momentary maximum Discharge (cfs)	Date	Minimum day (cfs)	Mean (cfs)	*Adjusted mean (cfs)	*Adjusted mean (mgd)
1956	1437	11,900	Mar. 17, 1956	34	2,465	2,466	1,590
1957	1507	11,600	Apr. 7, 1957	96	1,739	1,739	1,120
1958	1557	10,700	Apr. 15, 1958	104	1,391	1,378	891
1959	1627	12,100	Jan. 22, 1959	95	1,621	1,615	1,040
1960	1707	10,400	Apr. 20, 1960	69	2,150	2,155	1,390
1961	S.R.	9,220	Mar. 6, 1961	60	1,548	1,549	1,000
1962	S.R.	9,800	Mar. 16, 1962	52	1,131	1,144	739
1963	S.R.	10,500	Apr. 4, 1963	95	1,363	1,361	880

*Adjusted for change in contents in Rushford Lake and Mount Morris Reservoir.

Table 11

4-2280. Conesus Creek near Lakeville, N. Y.

Location.--Lat 42°51'20", long 77°43'00", on upstream side of right abutment of Millville Bridge, 1-1/2 miles downstream from Lakeville, Livingston County.

Drainage area.--72.0 sq mi.

Gage.--Staff gage. Altitude of gage is 810 ft (from topographic map).

Average discharge.--15 years (1919-34), 48.3 cfs.

Extremes.--1919-34: Maximum discharge, 625 cfs Dec. 1, 1928 (gage height, 3.6 ft); minimum, 0.4 cfs Dec. 18, 20, 21, 1932.

Remarks.--Considerable regulation by Conesus Lake. Water supply for villages of Avon and Geneseo taken from Conesus Lake.

Yearly summary of stream discharge

Water year ending Sept. 30

Water year	WSP no.	Momentary maximum Discharge (cfs)	Date	Minimum day (cfs)	Mean (cfs)	Mean (mgd)
1920	524	159	Mar. 17, 1920	a/ 8	a/ 37.0	23.9

a/ Previously published only in WSP 1307.

Table 11

4-2280. Conesus Creek near Lakeville, N. Y. (Continued)

Yearly summary of stream discharge

Water year ending Sept. 30

Water year	WSP no.	Momentary maximum Discharge (cfs)	Date	Minimum day (cfs)	Mean (cfs)	Mean (mgd)
1921	524	157	Feb. 16, 1921	2.8	42.2	27.3
1922	544	178	Apr. 1, 1922	2.5	46.8	30.2
1923	564	202	Mar. 20, 1923	--	38.3	24.8
1924	584	285	May 15, 1924	.7	43.4	28.0
1925	604	296	Feb. 23, 1925	10	56.8	36.7
1926	624	308	Apr. 10, 1926	6.9	50.6	32.7
1927	644	188	Mar. 21, 1927	6.9	50.2	32.5
1928	664	625	Dec. 1, 1927	6.1	101	65.3
1929	684	400	Apr. 22, 1929	4.1	60.8	39.3
1930	699	278	Mar. 22, 1930	1.1	51.3	33.2
1931	714	168	Apr. 5, 1931	.6	35.4	22.9
1932	729	275	May 11, 1932	1.4	52.8	34.1
1933	744	189	May 14, 1933	.4	40.6	26.2
1934	759	86	Apr. 12-17, 1934	.8	17.1	11.1

Table 12

4-2285. Genesee River at Avon, N. Y.

Location.--Lat 42°55'05", long 77°45'30", on left bank at downstream side of bridge on U.S. Highway 20 (State Highway 5), 0.3 mile west of Avon, Livingston County, and 0.8 mile downstream from Conesus Creek.

Drainage area.--1,666 sq mi.

Records available.--August 1955 to September 1963.

Gage.--Water-stage recorder; wire-weight gage read twice daily used for stages below 23.7 ft. Datum of gage is 500.00 ft above mean sea level (levels by Corps of Engineers).

Average discharge.--8 years (1955-63), 1,862 cfs (unadjusted).

Extremes.--1955-63: Maximum discharge, 15,600 cfs Mar. 7, 1956 (gage height, 37.20 ft, from graph based on gage readings); minimum, 56 cfs Oct. 5, 1955 (gage height, 13.73 ft, from graph based on gage readings).

Table 12

4-2285. Genesee River at Avon, N. Y. (Continued)

Remarks.--Diurnal fluctuation at low flow caused by powerplants. Flow regulated to some extent by Rushford Lake (capacity, 1,106,000,000 cu ft), and, at high flow, by Mount Morris Reservoir (see p. 15).

Yearly summary of stream discharge

Water year ending Sept. 30

Water year	WSP no.	Momentary maximum Discharge (cfs)	Date	Minimum day (cfs)	Mean (cfs)	*Adjusted mean (cfs)	*Adjusted mean (mgd)
1955	1437	--	--	--	--	--	--
1956	1437	15,600	Mar. 7, 1956	63	2,831	2,831	1,830
1957	1507	12,400	Apr. 7, 1957	115	1,899	1,899	1,230
1958	1557	10,800	Apr. 16, 1958	122	1,495	1,482	958
1959	1627	9,720	Apr. 9, 1959	104	1,837	1,831	1,180
1960	1707	9,820	Apr. 17, 1960	129	2,465	2,470	1,600
1961	S.R.	9,620	May 7, 1961	94	1,732	1,732	1,120
1962	S.R.	8,130	Mar. 14, 1962	82	1,228	1,240	801
1963	S.R.	10,200	Apr. 4, 1963	138	1,407	1,405	908

*Adjusted for change in contents in Rushford Lake and Mount Morris Reservoir.

Table 13

4-2289.5. Canadice Lake near Hemlock, N. Y.

Location.--Lat 42°44'25", long 77°34'15", upstream from weir at outlet, in Ontario County, 4 miles southeast of Hemlock, Livingston County.

Drainage area.--12.6 sq mi.

Records available.--April 1903 to September 1963.

Gage.--Hook gage. Datum of gage is 1,093.00 ft above mean sea level (furnished by city of Rochester).

Remarks.--Subsequent to May 1949, discharge from lake below elevation 1,092.00 ft augmented by pumps. Available storage below elevation 1,092.00 ft, 287,058,980 cu ft.

Cooperation.--Records of contents, in cubic feet, furnished by Department of Public Works, city of Rochester, rounded off by Geological Survey.

Table 13
4-2289.5 Canadice Lake near Hemlock, N. Y. (Continued)

References.--Month-end contents figures are to be found in WSP 1307, for the period of record through September 1950, in WSP 1727 for the period October 1950 through September 1960, and in the files of the Geological Survey and the Department of Public Works, city of Rochester.

Table 14
4-2290. Canadice Lake Outlet near Hemlock, N. Y.

Location.--Lat 42°44'25", long 77°34'15", upstream from weir at outlet of Canadice Lake, Ontario County, 4 miles southeast of Hemlock, Livingston County.

Drainage area.--12.6 sq mi.

Records available.--April 1903 to September 1963.

Gage.--Hook gage. Datum of gage is 1,093.00 ft above mean sea level (furnished by city of Rochester). Gage readings have been reduced to elevations above mean sea level.

Average discharge.--60 years (1903-63), 11.8 cfs (unadjusted).

Cooperation.--Records furnished by Department of Public Works, city of Rochester.

Yearly summary of stream discharge

Water year ending Sept. 30

Water year	WSP no.	Momentary maximum		Minimum day (cfs)	Mean (cfs)	*Adjusted mean	
		Discharge (cfs)	Date			(cfs)	(mgd)
1903	129	--	--	--	--	--	--
1904	170	--	--	--	15.8	15.5	10.0
1905	170	--	--	--	11.9	12.2	7.88
1906	206	--	--	--	10.2	10.3	6.66
1907	244	--	--	--	15.3	14.2	9.18
1908	244	--	--	--	16.1	16.4	10.6
1909	264	--	--	--	8.82	8.06	5.21
1910	284	--	--	--	8.19	9.58	6.19
1911	304	--	--	--	5.56	5.25	3.39
1912	324	--	--	--	11.5	11.6	7.50
1913	354	--	--	--	15.7	15.4	9.95
1914	384	--	--	--	14.2	15.9	10.3
1915	404	--	--	--	10.9	9.89	6.39

* Adjusted for change in contents in Canadice Lake.

Table 14

4-2290. Canadice Lake Outlet near Hemlock, N. Y. (Continued)

Yearly summary of stream discharge

Water year ending Sept. 30

Water year	WSP no.	Momentary maximum Discharge (cfs)	Momentary maximum Date	Minimum day (cfs)	Mean (cfs)	*Adjusted mean (cfs)	*Adjusted mean (mgd)
1916	434	--	--	--	19.8	19.9	12.9
1917	454	--	--	--	9.91	10.1	6.53
1918	504	--	--	--	11.6	10.9	7.04
1919	504	--	--	--	11.0	11.8	7.63
1920	504	--	--	--	9.24	7.91	5.11
1921	524	--	--	--	8.91	7.92	5.12
1922	544	--	--	--	9.83	12.2	7.88
1923	564	--	--	--	9.62	6.79	4.39
1924	584	--	--	--	9.16	11.5	7.43
1925	604	--	--	--	9.64	7.94	5.13
1926	624	--	--	--	10.8	11.6	7.50
1927	644	--	--	--	9.48	10.6	6.85
1928	664	--	--	--	20.1	19.0	12.3
1929	684	--	--	--	15.1	14.5	9.37
1930	699	--	--	--	10.5	10.8	6.98
1931	714	--	--	--	9.27	9.18	5.93
1932	729	--	--	--	11.8	10.9	7.04
1933	744	--	--	--	10.6	10.1	6.53
1934	759	--	--	--	4.76	5.24	3.39
1935	784	--	--	--	10.0	10.5	6.79
1936	804	--	--	--	11.4	11.9	7.69
1937	824	--	--	--	12.6	13.5	8.72
1938	854	--	--	--	10.2	10.1	6.53
1939	874	--	--	--	11.3	10.7	6.92
1940	894	--	--	--	11.9	13.0	8.40
1941	924	--	--	--	9.75	9.15	5.91
1942	954	--	--	--	12.7	11.5	7.43
1943	974	--	--	--	15.9	18.6	12.0
1944	1004	--	--	--	10.7	9.32	6.02
1945	1034	--	--	--	14.7	16.7	10.8
1946	1054	--	--	--	16.2	13.8	8.92
1947	1084	--	--	--	17.4	15.9	10.3
1948	1114	--	--	--	9.15	10.5	6.79
1949	1144	--	--	--	8.57	4.81	3.11
1950	1174	--	--	--	11.2	9.33	6.03

* Adjusted for change in contents in Canadice Lake.

Table 14

4-2290. Canadice Lake Outlet near Hemlock, N. Y. (Continued)

Yearly summary of stream discharge

Water year ending Sept. 30

Water year	WSP no.	Momentary maximum Discharge (cfs)	Momentary maximum Date	Minimum day (cfs)	Mean (cfs)	*Adjusted (cfs)	mean (mgd)
1951	1207	--	--	--	10.5	18.4	11.9
1952	1237	--	--	--	13.2	10.9	7.04
1953	1277	--	--	--	12.8	11.8	7.63
1954	1337	--	--	--	12.2	12.7	8.21
1955	1387	--	--	--	10.4	9.57	6.19
1956	1437	--	--	--	18.7	21.7	14.0
1957	1507	--	--	--	12.6	11.1	7.17
1958	1557	--	--	--	10.1	12.3	7.95
1959	1627	--	--	--	15.2	11.5	7.43
1960	1707	--	--	--	14.3	14.1	9.11
1961	S.R.	--	--	--	8.85	11.3	7.30
1962	S.R.	--	--	--	11.3	8.81	5.69
1963	S.R.	--	--	--	9.51	9.27	5.99

* Adjusted for change in contents in Canadice Lake.

Table 15

4-2295. Honeoye Creek at Honeoye Falls, N. Y.

Location.--Lat 42°57'25", long 77°35'20", on right bank 25 ft downstream from highway bridge at Honeoye Falls, Monroe County, and 13 miles upstream from mouth.

Drainage area.--197 sq mi.

Records available.--October 1945 to September 1963.

Gage.--Water-stage recorder. Datum of gage is 609.98 ft above mean sea level (levels by Corps of Engineers).

Average discharge.--18 years (1945-63), 167 cfs (adjusted for storage and diversion).

Extremes.--1945-63: Maximum discharge, 4,630 cfs Mar. 28, 1950 (gage height, 6.42 ft), from rating curve extended above 2,100 cfs by logarithmic plotting; minimum, 0.06 cfs Aug. 28, 1949.

Table 15
4-2295. Honeoye Creek at Honeoye Falls, N. Y. (Continued)

Remarks.--Some diversion from and regulation by Hemlock and Canadice Lakes for water supply of city of Rochester. Diurnal fluctuation at low flow caused by mills above station.

Yearly summary of stream discharge

Water year ending Sept. 30

Water year	WSP no.	Momentary maximum Discharge (cfs)	Date	Minimum day (cfs)	Mean (cfs)	*Adjusted mean (cfs)	(mgd)
1946	1054	1,490	Dec. 7,1945	4.4	153	196	127
1947	1084	1,740	June 3,1947	6.8	170	235	152
1948	1114	1,080	Mar. 16,1948	1.3	91.2	145	93.7
1949	1144	1,200	Jan. 6,1949	.1	65.5	97.5	62.9
1950	1174	4,630	Mar. 28,1950	.7	77.0	125	80.8
1951	1207	1,980	Feb. 22,1951	.4	162	253	164
1952	1237	1,610	Mar. 11,1952	.4	98.5	153	98.9
1953	1277	2,080	June 22,1953	.4	93.0	154	99.5
1954	1337	1,890	May 2,1954	.4	107	172	111
1955	1387	3,790	Mar. 1,1955	.3	99.0	148	95.7
1956	1437	3,880	Mar. 7,1956	.7	218	286	185
1957	1507	1,700	May 20,1957	1.0	91.4	142	91.8
1958	1557	1,090	Apr. 8,1958	1.1	87.2	142	91.8
1959	1627	2,690	Jan. 22,1959	.3	123	169	109
1960	1707	3,700	Mar. 30,1960	.6	159	220	142
1961	S.R.	1,570	Apr. 25,1961	.6	86.2	143	92.4
1962	S.R.	1,200	Apr. 30,1962	.9	73.8	114	73.7
1963	S.R.	2,130	Mar. 18,1963	.3	68.8	110	71.1

* Adjusted for diversions from and change in contents in Hemlock and Canadice Lakes; outlet of Honeoye Lake is not controlled (records of diversion and change in contents furnished by Department of Public Works, city of Rochester).

Table 16
4-2305. Oatka Creek at Garbutt, N. Y.

Location.--Lat 43°00'30", long 77°47'25", on right bank 40 ft downstream from highway bridge at Garbutt, Genesee County, 2 miles southwest of Scottsville, and 3-1/2 miles upstream from mouth.

Drainage area.--208 sq mi.

Table 16

4-2305. Oatka Creek at Garbutt, N. Y. (Continued)

Records available.--October 1945 to September 1963.

Gage.--Water-stage recorder. Datum of gage is 560.89 ft above mean sea level (levels by Corps of Engineers).

Average discharge.--18 years (1945-63), 198 cfs.

Extremes.--1945-63: Maximum discharge, 6,920 cfs Mar. 31, 1960 (gage height, 8.64 ft); minimum, 3.3 cfs Sept. 11, 12, 1958; minimum gage height, 1.88 ft June 19, 1959, result of regulation.

Remarks.--Chemical analyses of water collected at this site during water years 1960 and 1961 will be published in WSP 1742 and 1882, and are summarized on page 42 of this report.

Yearly summary of stream discharge

Water year ending Sept. 30

Water year	WSP no.	Momentary maximum Discharge (cfs)	Date	Minimum day (cfs)	Mean (cfs)	(cfs)
1946	1054	2,830	Jan. 7, 1946	23	244	158
1947	1084	3,680	Apr. 6, 1947	20	302	195
1948	1114	2,150	Mar. 23, 1948	27	189	122
1949	1144	1,030	Feb. 15, 1949	21	126	81.4
1950	1174	6,080	Mar. 29, 1950	19	178	115
1951	1207	2,480	Dec. 5, 1950	26	273	176
1952	1237	2,960	Mar. 12, 1952	20	190	123
1953	1277	1,080	Mar. 28, 1953	16	130	84.0
1954	1337	2,280	Feb. 17, 1954	23	171	111
1955	1387	5,310	Mar. 2, 1955	19	195	126
1956	1437	5,880	Mar. 8, 1956	19	315	204
1957	1507	3,500	Jan. 24, 1957	25	209	135
1958	1557	2,320	Apr. 8, 1958	16	149	96.3
1959	1627	3,240	Apr. 3, 1959	21	213	138
1960	1707	6,920	Mar. 31, 1960	23	247	160
1961	S.R.	3,090	Apr. 26, 1961	16	178	115
1962	S.R.	1,410	Mar. 13, 1962	17	123	79.5
1963	S.R.	2,610	Mar. 18, 1963	21	137	88.5

Table 17

4-2310. Black Creek at Churchville, N. Y.

Location.--Lat 43°06'00", long 77°53'00", on right bank at east end of Carrol Street in Churchville, Monroe County, 60 ft downstream from main-line tracks of New York Central Railroad and 1 mile upstream from unnamed tributary.

Drainage area.--123 sq mi.

Records available.--October 1945 to September 1963.

Gage.--Water-stage recorder. Datum of gage is 552.45 ft above mean sea level (levels by Corps of Engineers).

Average discharge.--18 years (1945-63), 102 cfs.

Extremes.--1945-63: Maximum discharge, 4,880 cfs Mar. 31, 1960 (gage height, 9.44 ft); minimum, 0.3 cfs Aug. 5-7, Sept. 15, 1959 (gage height, 0.93 ft).

Remarks.--Prior to May 1952, small diversion by New York Central Railroad Co. and slight regulation by pumping operations above station. Chemical analyses of water collected at this site during water year 1962 are published in WSP 1942, and are summarized on page 42 of this report.

Yearly summary of stream discharge

Water year ending Sept. 30

Water year	WSP no.	Momentary maximum Discharge (cfs)	Momentary maximum Date	Minimum day (cfs)	Mean (cfs)	Mean (mgd)
1946	1054	1,740	Mar. 5, 1946	3.4	131	84.7
1947	1084	1,940	Apr. 6, 1947	4.9	163	105
1948	1114	1,540	Feb. 20, 1948	3.1	97.2	62.8
1949	1144	800	Feb. 16, 1949	2.4	61.2	39.6
1950	1174	4,750	Mar. 28, 1950	.9	106	68.5
1951	1207	1,430	Feb. 21, 1951	.7	145	93.7
1952	1237	1,620	Mar. 12, 1952	2.2	93.1	60.2
1953	1277	745	Mar. 28, 1953	2.1	52.3	33.8
1954	1337	1,660	Feb. 18, 1954	2.2	79.8	51.6
1955	1387	1,780	Mar. 2, 1955	1.4	103	66.6
1956	1437	2,980	Mar. 8, 1956	3.3	177	114
1957	1507	1,910	Jan. 24, 1957	3.0	106	68.5
1958	1557	835	Apr. 8, 1958	2.1	69.3	44.8
1959	1627	1,700	Apr. 3, 1959	.3	116	75.0
1960	1707	4,880	Mar. 31, 1960	1.2	138	89.2
1961	S.R.	702	Apr. 26, 1961	2.0	67.4	43.5
1962	S.R.	1,530	Mar. 13, 1962	1.1	58.6	37.9
1963	S.R.	2,460	Mar. 18, 1963	.7	80.9	52.3

Table 18

4-2315. Genesee River at Rochester, N. Y.

Location.--Lat 43°07'25", long 77°37'55", on right bank in pumphouse at downstream side of Elmwood Avenue Bridge, about 3 miles upstream from Erie Canal aqueduct crossing, 3-1/4 miles downstream from Black Creek, 3-1/2 miles upstream from center of city of Rochester, Monroe County, and 7-1/2 miles upstream from mouth.

Drainage area.--2,450 sq mi (revised).

Gage.--Water-stage recorder. Datum of gage is 506.848 ft above mean sea level, Barge Canal datum. Prior to December 1910, staff gage on downstream end of first pier from right abutment at same datum.

Average discharge.--13 years (1905-18), 2,580 cfs.

Extremes.--1904-18: Maximum discharge, 48,300 cfs Mar. 30, 1916 (gage height, 12.3 ft); minimum, 102 cfs Nov. 1, 1912.

Remarks.--Some diversion from Hemlock Lake for water supply of city of Rochester, and from Allen Creek for water supply of Erie Canal. Some water may have been received from 26.6 sq mi on Genesee-Allegheny divide through Cuba Reservoir. Slight regulation by mills, reservoir, and lakes.

Yearly summary of stream discharge

Water year ending Sept. 30

Water year	WSP no.	Momentary maximum Discharge (cfs)	Momentary maximum Date	Minimum day (cfs)	Mean (cfs)	Mean (mgd)
1904	206	--	--	--	--	--
1905	206	--	--	--	--	--
1906	206	a/15,500	Mar. 29, 1906	400	1,890	1,220
1907	244	a/15,000	Jan. 9, 1907	310	2,880	1,860
1908	244	a/21,800	Mar. 17, 1908	--	3,460	2,240
1909	264	a/21,400	May 3,4, 1909	--	2,180	1,410
1910	284	a/29,000	Mar. 5, 1910	174	2,180	1,410
1911	304	14,700	Mar. 29, 1911	206	2,310	1,490
1912	324	25,500	Apr. 3, 1912	250	2,550	1,650
1913	354	42,000	Mar. 28, 1913	102	2,820	1,820
1914	384	26,900	Mar. 30, 1914	170	2,580	1,670
1915	404	20,000	Feb. 26, 1915	313	1,960	1,270
1916	434	48,300	Mar. 30, 1916	264	3,930	2,540
1917	454	14,200	Mar. 14, 1917	243	2,190	1,420
1918	474	27,900	Mar. 16, 1918	300	2,610	1,690

a/ Maximum daily.

Table 19

4-2320. Genesee River at Driving Park Avenue, Rochester, N. Y.

Location.--Lat 43°10'50", long 77°37'40", on right bank at Rochester, Monroe County, 40 ft downstream from plant 5 of Rochester Gas & Electric Corp. and 100 ft upstream from Driving Park Avenue Bridge.

Drainage area.--2,467 sq mi.

Records available.--December 1919 to September 1963.

Gage.--Water-stage recorder at present site and datum since June 20, 1956. Datum of gage is 247 ft above mean sea level, Erie (Barge) Canal datum. Prior to Apr. 4, 1927, water-stage recorder and chain gage in plant 5 at datum 3.00 ft higher. Apr. 4, 1927, to June 19, 1956, water-stage recorder at present site at datum 3.00 ft higher.

Average discharge.--43 years (1920-63), 2,738 cfs.

Extremes.--1919-63: Maximum discharge, 34,400 cfs Mar. 19, 1942; maximum gage height, 17.08 ft Apr. 2, 1940 (present datum); minimum discharge, less than 10 cfs, occurred during low-water periods in some years when powerplant was shut down; minimum daily 91 cfs Jan. 9, 29, Feb. 1, 8, 1961.

Maximum discharge known, about 54,000 cfs Mar. 18, 1865.

Remarks.--Extensive diurnal fluctuation caused by powerplants above station. New York State Erie (Barge) Canal crosses river 5.4 miles above station. Water diverted by the canal from Lake Erie is discharged into river from the west, the canal again diverting a smaller amount of water from river to the east. Additional regulation is provided by Rushford Lake and Mount Morris Reservoir. Chemical analyses of water collected at this site during water year 1955 are published in WSP 1400, and are summarized on page 42 of this report.

Yearly summary of stream discharge

Water year ending Sept. 30

Water year	WSP no.	Momentary maximum		Minimum day	Mean	
		Discharge (cfs)	Date	(cfs)	(cfs)	(mgd)
1920	504	26,000	Mar. 17, 1920	--	--	--
1921	524	a/16,500	Mar. 9, 1921	560	2,200	1,420
1922	544	15,700	Apr. 2, 1922	420	2,530	1,630
1923	564	19,300	Mar. 13, 1923	389	2,120	1,370
1924	584	21,600	Apr. 20, 1924	--	2,780	1,800
1925	604	24,800	Feb. 25, 1925	661	2,380	1,540

a/ Previously published only in WSP 1307.

Table 19

4-2320. Genesee River at Driving Park Avenue, Rochester, N. Y. (Continued)

Yearly summary of stream discharge

Water year ending Sept. 30

Water year	WSP no.	Momentary maximum		Minimum day	Mean	
		Discharge (cfs)	Date	(cfs)	(cfs)	(mgd)
1926	624	22,800	Apr. 10, 1926	689	2,730	1,760
1927	644	22,400	Jan. 24, 1927	219	3,070	1,980
1928	664	29,600	Dec. 2, 1927	772	4,110	2,660
1929	684	23,800	Apr. 23, 1929	740	3,390	2,190
1930	699	19,200	Jan. 16, 1930	686	3,010	1,950
1931	714	17,300	Mar. 30, 1931	350	2,010	1,300
1932	729	19,400	May 11, 1932	625	2,930	1,890
1933	744	19,900	Mar. 16, 1933	586	2,460	1,590
1934	759	22,300	Mar. 5, 1934	451	1,740	1,120
1935	784	22,700	Jan. 23, 1935	610	2,383	1,540
1936	804	27,700	Mar. 28, 1936	500	2,795	1,810
1937	824	20,200	Apr. 23, 1937	465	2,854	1,840
1938	854	19,000	Mar. 7, 1938	628	2,487	1,610
1939	874	19,000	Feb. 23, 1939	600	2,474	1,600
1940	894	33,500	Apr. 2, 1940	375	2,712	1,750
1941	924	22,700	Apr. 7, 1941	676	2,264	1,460
1942	954	34,400	Mar. 19, 1942	597	2,697	1,740
1943	974	25,400	Jan. 1, 1943	720	4,074	2,630
1944	1004	18,900	Mar. 17, 1944	705	2,448	1,580
1945	1034	24,700	Mar. 5, 1945	711	3,447	2,230
1946	1054	18,900	Jan. 7, 1946	458	3,376	2,180
1947	1084	23,800	Apr. 8, 1947	782	3,859	2,490
1948	1114	21,600	Mar. 23, 1948	685	2,723	1,760
1949	1144	16,400	Feb. 16, 1949	383	2,041	1,320
1950	1174	33,100	Mar. 30, 1950	418	2,510	1,620
1951	1207	20,200	Feb. 22, 1951	311	3,666	2,370
1952	1237	17,700	Mar. 12, 1952	286	2,886	1,870
1953	1277	17,100	Mar. 25, 1953	483	2,328	1,500
1954	1337	17,500	Feb. 17, 1954	449	2,446	1,580
1955	1387	19,100	Mar. 2, 1955	340	2,082	1,350
1956	1437	24,300	Mar. 8, 1956	417	4,237	2,740
1957	1507	17,000	Apr. 8, 1957	436	2,716	1,760
1958	1557	14,900	Apr. 7, 1958	316	2,166	1,400
1959	1627	17,700	Apr. 2, 1959	370	2,744	1,770
1960	1707	25,800	Mar. 31, 1960	482	3,606	2,330

Table 19

4-2320. Genesee River at Driving Park Avenue, Rochester, N. Y. (Continued)

Yearly summary of stream discharge

Water year ending Sept. 30

Water year	WSP no.	Momentary maximum		Minimum day	Mean	
		Discharge (cfs)	Date	(cfs)	(cfs)	(mgd)
1961	S.R.	15,400	Apr. 26, 1961	91	2,444	1,580
1962	S.R.	11,900	Apr. 8, 1962	310	1,718	1,110
1963	S.R.	21,500	Mar. 18, 1963	438	2,092	1,350

DURATION OF DAILY FLOWS

How much can a stream be "depended upon" to have a certain flow all or most of the time? The answer to this question is contained in graphs and tables of "flow-duration data", such as table 20 and figure 2.

For example, for the first stream site listed in table 20, the Genesee River at Scio, note that 34 cfs is shown on the top line under 90 percent. This means that 90 percent of the time (328 days in an "average" year) the discharge of the Genesee River at Scio will be at least 34 cfs. Also, because the drainage area upstream from that site is 309 square miles, the discharge per square mile is slightly more than 0.1 cfs 90 percent of the time, as shown in figure 2.

This type of information (especially the "99 percent" point, representing 361 days in an "average" year) is useful both to towns and to industries relying upon streams for their water supplies, so that adequate water storage structures can be designed to prevent water restrictions or plant shutdowns.

Table 20 contains flow-duration records for all the long-term gaging stations in the basin. In some cases, more than one set of data are shown for a single site. This is because streamflow conditions upstream from the site have changed significantly during the period of record. Such a change is caused by the building of a dam or a change in manmade regulation of a stream. The end of the period of duration analysis of most records shown in table 20 is the end of September 1960, even though most of the streams listed are still being measured. As more records of streamflow are accumulated, more accurate analyses of flow-duration data will be possible.

In figure 2, note that at the "99-percent" point there is a considerable difference in flow per square mile among the three streams. The flow of Oatka Creek at Garbutt is higher than average during dry-weather periods because of the sustaining effect of springs in the Caledonia-Mumford area. The flow of Black Creek at Churchville is lower than average, because part of the flow is underground in the underlying limestone and is therefore unmeasured. The flow-per-square-mile of the Genesee River at Rochester at the 90- and 99-percent points (data in table 20 divided by 2,467 square miles) is considerably higher than comparable per-square-mile flow of other streams because canal water has been added to the normal flow of the Genesee River.

The information in table 20 and figure 2 may be used for predictions of the dependability or probability of future low flows of each stream shown, only so long as no major changes are made in the regulation of that stream.

Table 20.--Summary of flow-duration data

Station number	Stream and location	Period of record	Drainage area (sq mi)	DURATION OF DAILY FLOW Discharge, in cfs, which was equaled or exceeded for indicated percent of time												
				1	5	10	20	30	40	50	60	70	80	90	95	99
2215	Genesee River at Scio	1917-60	309	3,200	1,400	920	550	370	255	180	125	87	57	34	25.5	17.5
2220	Caneadea Creek at Caneadea	1950-60	61.5	670	435	340	190	60	18.5	8.8	5.9	4.2	3.1	2.2	1.7	1.3
2230	Genesee River at Portageville a/	1909-60	982	11,000	4,600	2,900	1,650	1,100	790	570	410	290	200	130	95	60
2250	Canaseraga Creek near Dansville	1916 b/ 1921-60	153	1,350	540	340	200	135	98	70	53	41	33	25	21.5	16.5
2255	Canaseraga Creek at Groveland	1916-19 1956-60	181	1,800	740	470	285	200	145	110	83	65	50	38	31	23.5
2260	Keshequa Creek at Craig Colony, Sonyea	1918-32	69.1	620	200	110	54	33	23	16	11.5	7.9	5.4	3.1	1.9	.9
2275	Genesee River at Jones Bridge near Mount Morris	1909-13 1916-51	1,419	13,500	6,100	3,750	2,100	1,400	990	730	550	400	290	190	140	85
2275	Genesee River at Jones Bridge near Mount Morris	1952-60 c/	1,419	10,000	6,900	4,500	2,350	1,700	1,200	840	560	390	265	160	125	84
2280	Conesus Creek near Lakeville	1920-34	72.0	250	160	125	82	56	38	26	20	14.5	8.9	3.3	1.9	1.0
2285	Genesee River at Avon	1956-60	1,666	11,500	8,500	6,200	3,200	2,200	1,600	1,150	800	540	360	220	160	125
2295	Honeoye Creek at Honeoye Falls	1946-60	197	1,000	480	310	180	115	75	47	25	11.5	5.2	2.1	1.1	.5
2305	Oatka Creek at Garbutt	1946-60	208	1,650	770	520	300	200	130	87	60	45	35	28	24.5	20
2310	Black Creek at Churchville	1946-60	123	1,000	460	280	150	89	55	36	24	14.5	8.9	5.4	4.0	2.0
2320	Genesee River at Driving Park Avenue, Rochester	1921-47	2,467	17,000	10,000	6,200	3,700	2,550	1,950	1,600	1,300	1,150	970	850	770	630
2320	Genesee River at Driving Park Avenue, Rochester	1948-60 d/	2,467	15,500	10,500	6,900	4,000	2,900	2,100	1,550	1,150	890	700	560	500	410

a/ Prior to 1947 published as "at St. Helena, N.Y."
b/ Records for water years 1911-12 not used; daily discharges questionable.
c/ Subsequent to operation of Mount Morris Reservoir.
d/ Subsequent to change in pattern of regulation and/or diversion of water from Erie (Barge) Canal.

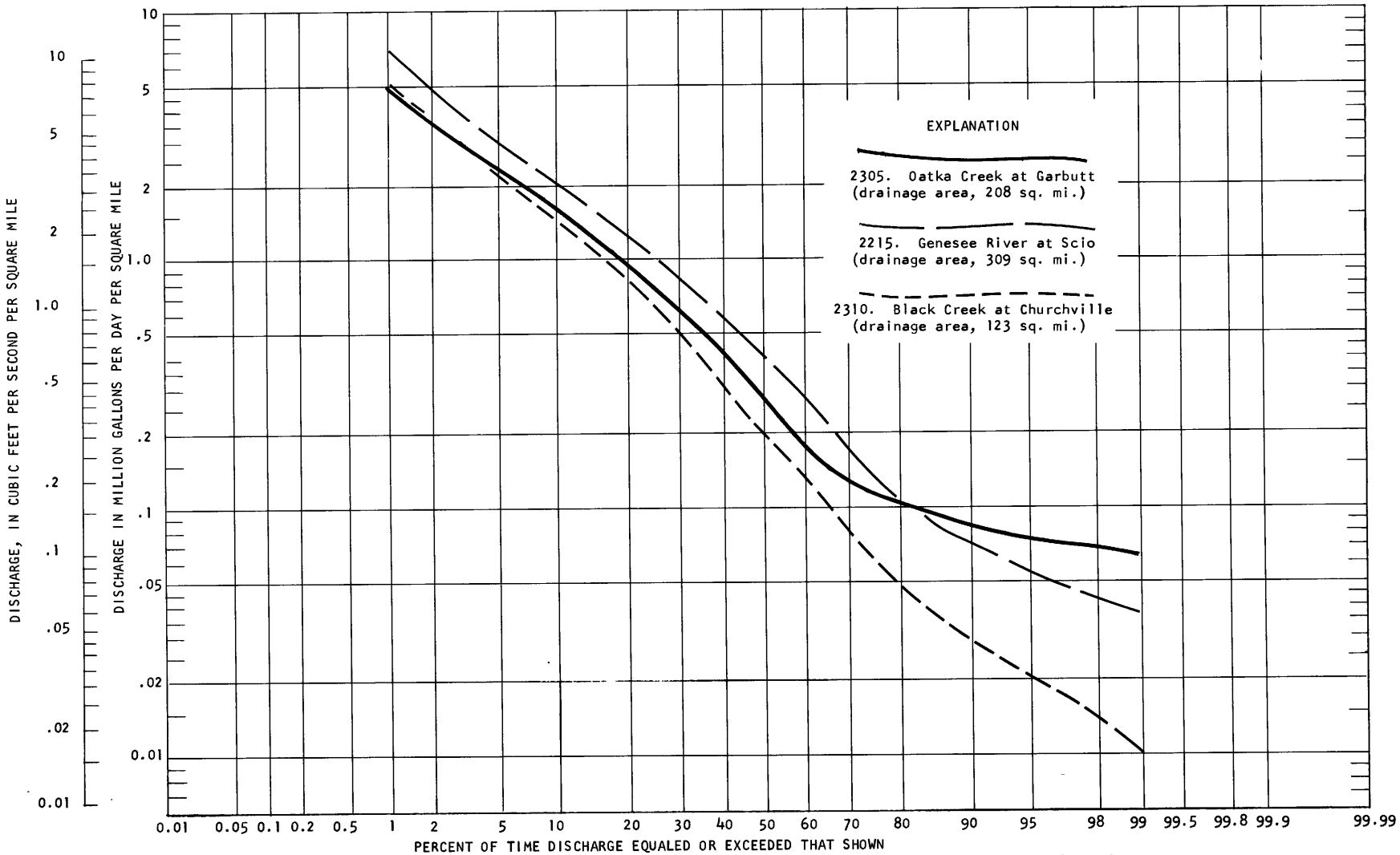
DISCHARGE, IN CUBIC FEET PER SECOND PER SQUARE MILE
DISCHARGE IN MILLION GALLONS PER DAY PER SQUARE MILE
PERCENT OF TIME DISCHARGE EQUALED OR EXCEEDED THAT SHOWN
EXPLANATION
2305. Oatka Creek at Garbutt
(drainage area, 208 sq. mi.)
2215. Genesee River at Scio
(drainage area, 309 sq. mi.)
2310. Black Creek at Churchville
(drainage area, 123 sq. mi.)

Figure 2.--Duration curves of daily flow of three streams in the Genesee River basin, 1946-60.

CHEMICAL QUALITY AND TEMPERATURE

Tables 21 and 22 summarize the chemical quality of streams at the six sites where samples have been collected periodically during at least one full water year. Part of the information shown is the average chemical concentration of each constituent indicated (table 21).

Maximum determined chemical concentrations are given in table 22, following the table of average concentrations. A maximum concentration shown in the table may actually represent the average conditions occurring during a period of several days. Although a sample of water is collected nearly every day, it is a common practice to combine the samples whose total dissolved-solids content is similar and then make the analyses of the composite sample, thus reducing the number and cost of chemical analyses. The maxima listed in table 22 are those which were actually determined by chemical analyses. However, somewhat higher concentrations would no doubt have been determined, if each daily sample collected had been given a complete chemical analysis.

Additional water analyses have been made of streams in some other parts of the Genesee River basin. Most of these analyses appear in a report prepared by Pauszek (1959).

As indicated in the table of water temperature in streams (table 23), the temperature was measured once or twice daily at each of six sites. The publications in which the full data on temperatures and chemical quality appear are indicated at the bottom of the temperature table (table 23) and the table of maximum determined chemical concentrations (table 22).

Figure 3 is a graph of the average chemical composition of Genesee River water at three locations. Note that the water becomes more highly mineralized as it flows northward toward the mouth of the river, a consequence mainly of the more soluble and different kinds of rocks through which the water passes in tributary areas in some downstream parts of the Genesee River basin.

SUMMARY OF CHEMICAL ANALYSES OF WATER IN STREAMS

Table 21.--Average concentrations, in parts per million

Site number	4-2215	4-2255	4-2275	4-2275
Stream and location	Genesee at Scio a/	Canaseraga at Groveland	Genesee near Mount Morris b/ (1,420 approx.)	Genesee near Mount Morris b/ (1,420 approx.)
Drainage area (sq mi)	332	181		
Water year	1955	1961	1955	1956 c/
Silica (SiO_2)	5.5	9.6	8.4	6.7
Iron (Fe)	.24	.13	.18	.46
Calcium (Ca)	20	52	43	36
Magnesium (Mg)	5.2	13	10	8.5
Sodium (Na)	22	9.2	46	27
Potassium (K)	1.8	2.8	2.8	2.3
Bicarbonate (HCO_3)	49	181	119	104
Sulfate (SO_4)	18	36	33	32
Chloride (Cl)	42	13	80	44
Fluoride (F)	.1	.2	.3	.1
Nitrate (NO_3)	3.4	5.2	2.2	2.9
Dissolved solids	158	243	310	230
Hardness as $CaCO_3$:				
Calcium, magnesium	71	186	146	123
Noncarbonate	30	37	49	37
Specific conductance (micromhos at 25°C)	265	400	521	385
Color	7	5	8	5
pH (range of values:)	Range 6.0-7.6	Range 7.1-7.8	Range 6.6-8.2	Range 7.0-8.3
Number of complete analyses	Analyses 26	Analyses 13	Analyses 39	Analyses 27
Number of additional partial analyses	9	1	25	29
Number of days represented by analyses	Days 364	Days 280	Days 364	Days 353

a/ About 1 mile downstream from stream-gaging site 4-2215.

b/ About 1 mile downstream from stream-gaging site 4-2275.

c/ Time-weighted average.

Table 21.--Average concentrations, in parts per million (Continued)

Site number	4-2305	4-2305	4-2310	4-2320
Stream and location	Oatka at Garbutt	Oatka at Garbutt	Black at Churchville d/	Genesee at Rochester
Drainage area (sq mi)	208	208	(123 approx.)	2,467
Water year	1960 c/	1961	1962 c/	1955
Silica (SiO_2)	9.7	8.3	12	4.6
Iron (Fe)	.08	.08	.12	.28
Calcium (Ca)	156	156	149	65
Magnesium (Mg)	23	23	32	13
Sodium (Na)	16	15	13	24
Potassium (K)	2.2	2.4	3.0	2.2
Bicarbonate (HCO_3)	206	187	193	139
Sulfate (SO_4)	280	269	334	90
Chloride (Cl)	27	28	27	41
Fluoride (F)	.3	.3	.3	.1
Nitrate (NO_3)	5.0	5.0	2.4	3.4
Dissolved solids	676	692	702	349
Hardness as $CaCO_3$:				
Calcium, magnesium	471	447	499	214
Noncarbonate	302	294	340	100
Specific conductance (micromhos at 25°C)	903	855	935	522
Color	4	6	17	12
pH (range of values:)	Range 7.1-7.9	Range 7.1-7.7	Range 6.7-8.2	Range 7.1-8.4
Number of complete analyses	Analyses 24	Analyses 19	Analyses 14	Analyses 36
Number of additional partial analyses	13	9	7	14
Number of days represented by analyses	Days 366	Days 301	Days 351	Days 365

c/ Time-weighted average.

d/ About 0.2 mile upstream from stream-gaging site 4-2310.

Table 22.--Maximum determined concentrations, in parts per million

Site number	4-2215	4-2255	4-2275	4-2275
Stream and location	Genesee at Scio a/	Canaseraga at Groveland	Genesee near Mount Morris b/ (1,420 approx.)	Genesee near Mount Morris b/ (1,420 approx.)
Drainage area (sq mi)	332	181		
Water year	1955	1961	1955	1956
Silica (SiO_2)	15	13	54	15
Iron (Fe)	2.8	.34	.55	3.9
Calcium (Ca)	29	60	58	62
Magnesium (Mg)	7.9	17	17	12
Sodium (Na)	43	15	89	70
Potassium (K)	2.8	5.1	6.0	4.3
Bicarbonate (HCO_3)	99	216	181	215
Sulfate (SO_4)	45	43	63	78
Chloride (Cl)	76	21	344	210
Fluoride (F)	.4	.2	.7	.2
Nitrate (NO_3)	20	12	5.0	47
Dissolved solids	236	279	479	417
Hardness as $CaCO_3$:				
Calcium, magnesium	103	217	216	369
Noncarbonate	47	47	124	193
Specific conductance (micromhos at 25°C)	417	490	1,450	995
Color	16	9	31	10
WSP no. containing all chemical analyses	1400	1882 c/	1400	1450

a/ About 1 mile downstream from stream-gaging site 4-2215.
b/ About 1 mile downstream from stream-gaging site 4-2275.
c/ In preparation; not yet published.

Table 22.--Maximum determined concentrations, in parts per million (Continued)

Site number	4-2305	4-2305	4-2310	4-2320
Stream and location	Oatka at Garbutt	Oatka at Garbutt	Black at Church-ville d/	Genesee at Rochester
Drainage area (sq mi)	208	208	(123 approx.)	2,467
Water year	1960	1961	1962	1955
Silica (SiO_2)	17	12	14	19
Iron (Fe)	.31	.22	.98	1.6
Calcium (Ca)	241	269	251	91
Magnesium (Mg)	32	38	50	19
Sodium (Na)	20	21	27	41
Potassium (K)	2.7	3.2	4.2	3.5
Bicarbonate (HCO_3)	243	256	260	178
Sulfate (SO_4)	520	600	584	157
Chloride (Cl)	34	50	57	80
Fluoride (F)	.5	.4	.7	.4
Nitrate (NO_3)	8.4	11	8.5	18
Dissolved solids	1,050	1,230	1,130	526
Hardness as $CaCO_3$:				
Calcium, magnesium	734	820	808	340
Noncarbonate	551	635	644	205
Specific conductance (micromhos at 25°C)	1,340	1,460	1,360	876
Color	17	14	24	100
WSP no. containing all chemical analyses	1742 c/	1882 c/	1942	1400

c/ In preparation; not yet published.

d/ About 0.2 mile upstream from stream-gaging site 4-2310.

SUMMARY OF STREAM TEMPERATURES

Table 23.--Maximum and minimum measured temperatures, in °F

Site number	4-2215	4-2255	4-2275		4-2305	
Stream and location	Genesee River at Scio a/	Canaseraga Creek at Groveland	Genesee River near Mount Morris b/		Oatka Creek at Garbutt	
Drainage area (sq mi)	332	181	(1,420 approx.)		208	
Water year	1955	1961	1955	1956	1960	1961
Number of measurements per day	1 (about 6 p.m.)	1	1 (about 6 a.m.)	1	1	1
Oct.-Dec.						
Maximum	74	66	68	65	64	56
Minimum	32	33	32	32	35	33
Jan.-Mar.						
Maximum	45 d/	38	48	39	42	42
Minimum	32	32	32	32	35	32
Apr.-June						
Maximum	80	68	73	76	68	65
Minimum	50 d/	33	43	39	40	36
July-Sept.						
Maximum	86	77	81	85	67	68
Minimum	60	41	58	52	53	53
WSP no. containing daily temperature data	1400	1882 c/	1400	1450	1742 c/	1882 c/

a/ About 1 mile downstream from stream-gaging site 4-2215.

b/ About 1 mile downstream from stream-gaging site 4-2275.

c/ In preparation; not yet published.

d/ Records incomplete.

Table 23.--Maximum and minimum measured temperatures, in °F (Continued)

Site number	4-2310	4-2320							
Stream and location	Black Creek at Churchville e/	Genesee River at Driving Park Avenue, Rochester							
Drainage area (sq mi)	(123 Approx.)	2,467							
Water year	1962	1955	1956	1957	1958	1959	1960	1961	1962	1963
Number of measurements per day	1 (about 6 p.m.)	1 (about 10:30 a.m.)	2 (about 10 a.m. and 4 p.m.)							
Oct.-Dec.										
Maximum	66	67	70	61	62	64	68	65	68	68
Minimum	32	33	37 d/	32	34	33	34	39	34	32
Jan.-Mar.										
Maximum	50	45	44	44	43	40 d/	38	44	40	45
Minimum	32	32	36	33	33	33	32	33	33	32
Apr.-June										
Maximum	86	75	78	79	70	78	72	65	76	78
Minimum	40	50d/	46	34	41	42	36	40	39	43
July-Sept.										
Maximum	76	83	75	79	77	79	78	76	78	79
Minimum	44	65	53	60	62	63	62	57	68	59
WSP no. containing daily temperature data	1942	1400	1450	1520	1571	1642	1742c/	1882c/	1942	1948c/

c/ In preparation; not yet published.

d/ Records incomplete.

e/ About 0.2 mile upstream from stream-gaging site 4-2310.

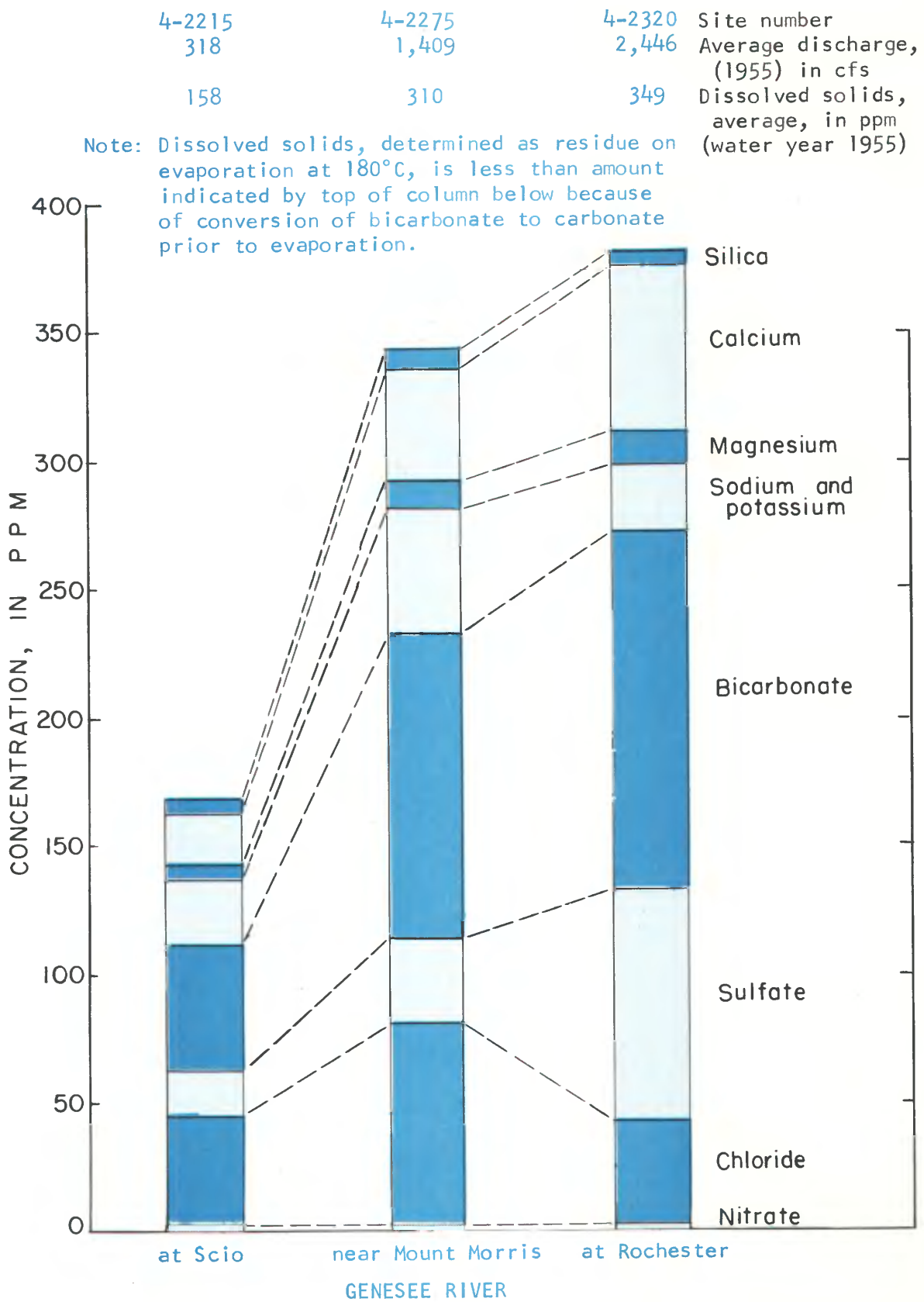

Figure 3.--Average chemical composition of the Genesee River at three sites, October 1954 to September 1955.

GROUND-WATER LEVELS

Three wells are described in the table of ground-water levels. These wells are a part of a Statewide network established to monitor the trends in water-level fluctuations (principally in relatively shallow water-table wells) and therefore changes in ground-water storage.

In general, ground-water levels are high in the spring and low in the late summer and fall. Sometimes a dry fall followed by an early freezing of the ground, may cause ground-water levels to continue to decline until raised by recharge during a winter or spring thaw. In any case, there appears to be no general long-term decline in water levels. By and large, the water in water-table wells returns to about the same high levels each spring. (See figure 4.)

The principal ground-water studies in the basin prior to 1964 have been investigations of the occurrence of ground water in Monroe County (Leggette, Gould, and Dollen, 1935) and in Ontario County (Mack and Digman, 1962). A brief report by Heath (1964) describes the occurrence of ground water throughout the State.

SUMMARY OF WATER LEVELS IN OBSERVATION WELLS

Table 24.--Water-level measurements in three observation wells

Note: Depths to water are in feet below land surface. "Years" listed in the first column are "calendar years," not "water years."

Well number	Gs 2	Lv 1	Wo 1
Location	Near Pavilion, Genesee County	In Geneseo, Livingston County	Near Castile, Wyoming County
Depth of well (feet)	21 (dug)	28 (dug)	14 (dug)
Diameter of well (inches)	36	48	24
Water-bearing formation	Glacial till	Glacial till	Glacial till
Beginning of record	1950	1942	1942
Frequency of measurements	Weekly	Monthly	Weekly
Depths to water: Highest level of record	0.10, May 14, 1960	0.3, Mar. 15, 1945	0.5, Apr. 5, 1947
Lowest level of record	6.55, Feb.11, 1961	9.74, Nov. 29, 1952	13.29, Feb. 12, 1961
1954--highest	.58 (Dec. 18)	3.97 (Apr.24)	1.05 (Mar. 6)
lowest	4.63 (Sept.11,25)	6.80 (Aug. 25)	11.74 (Nov.27)
1955--highest	.51 (Feb. 26)	3.74 (Mar. 25)	1.07 (Mar.22)
lowest	5.25 (Sept. 24)	7.60 (July 26)	12.83 (Oct. 9)
1956--highest	.42 (Feb. 25)	2.06 (Mar. 26)	.96 (Apr. 29)
lowest	2.90 (Aug. 25)	7.9 (Oct. 26)	11.26 (Nov. 17)
1957--highest	.50 (Feb.9,May 20)	3.27 (May 20)	.92 (May 20)
lowest	5.05 (Nov. 24)	8.2 (Nov. 25)	12.74 (Dec. 21)
1958--highest	.56 (Mar. 1)	3.95 (Mar. 25)	1.51 (Apr. 12)
lowest	4.14 (Sept. 13)	7.0 (Jan. 27)	12.54 (Jan. 4)
1959--highest	.52 (Dec. 12)	4.3 (Dec. 24)	1.27 (Dec. 12)
lowest	5.02 (Sept. 26)	8.5 (Sept. 25)	11.91 (Sept. 27)
1960--highest	.10 (May 14)	3.9 (May 25)	1.64 (Jan. 16)
lowest	6.17 (Dec. 31)	8.4 (Oct. 26)	12.87 (Dec. 31)
1961--highest	.66 (Apr. 26)	3.2 (Apr. 25)	1.09 (Apr. 26)
lowest	6.55 (Feb. 11)	7.2 (Nov. 25)	13.29 (Feb. 12)
1962--highest	.67 (Apr. 14)	4.4 (Apr. 25)	1.93 (May 4)
lowest	4.61 (Sept. 22)	7.7 (Sept. 25)	12.73 (Sept. 29)
1963--highest	.61 (Mar. 9)	4.1 (Mar. 25)	1.36 (Apr. 20)
lowest	4.59 (Nov. 2)	8.1 (Oct. 25)	13.06 (Nov. 30)

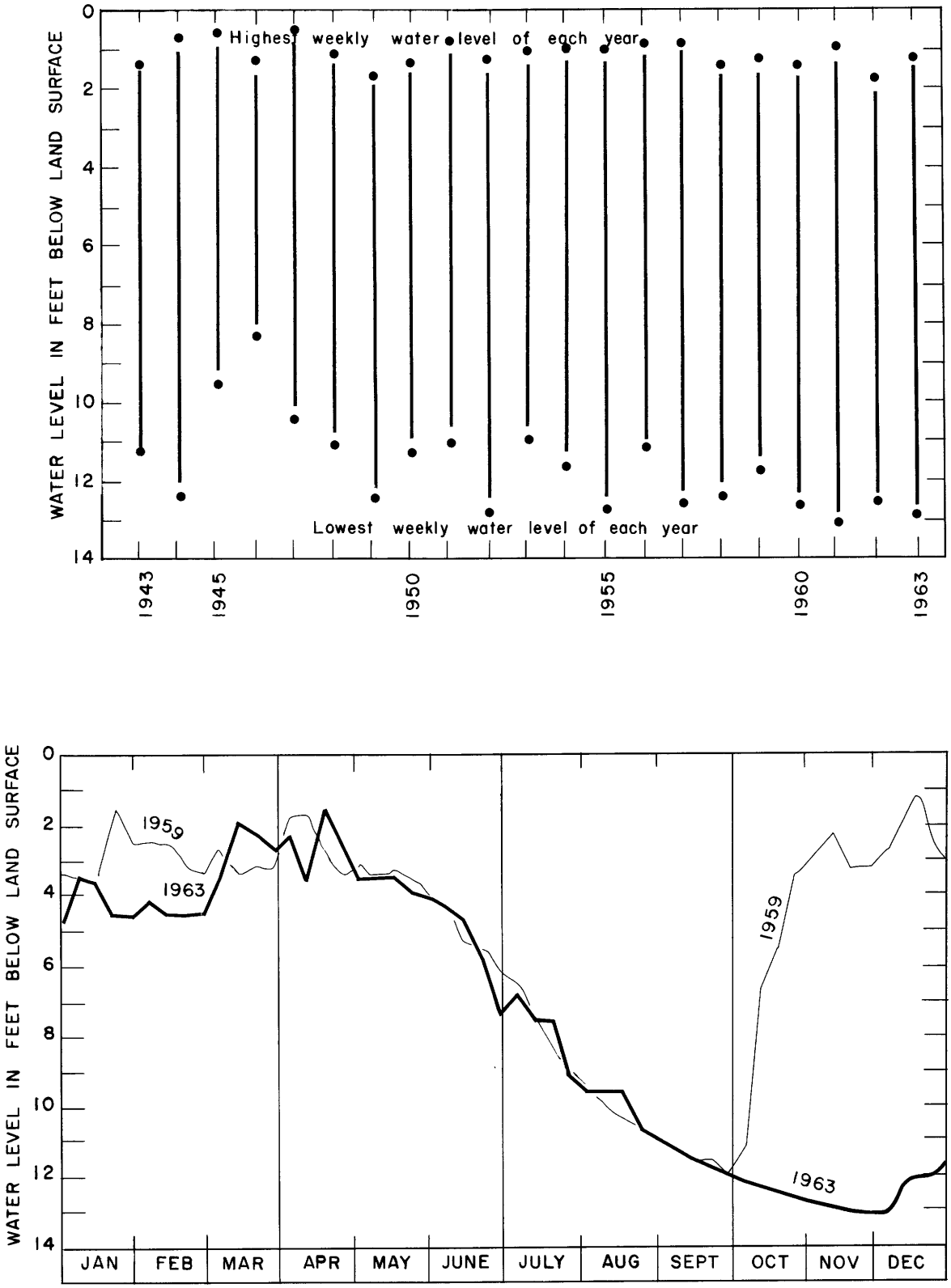

Figure 4.--Weekly water levels in observation well Wo 1, near Castile, Wyoming County, 1959 and 1963, and annual range of water-level fluctuations, 1943-63.

SELECTED LIST OF PUBLICATIONS ON THE WATER RESOURCES OF THE GENESEE RIVER BASIN

Note: Reports preceded by an asterisk (*) are out of print and no longer available for distribution from government agencies. Many of these reports are available for reference, however, at the offices of cooperating agencies, the office of the Water Resources Division, U.S. Geological Survey, Room 348 Federal Building, Broadway, Albany, N. Y., and at the larger public and university libraries. Water-supply papers of the Geological Survey which are still in print may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C., 20402. Circulars which are still in print may be obtained free on request to the U.S. Geological Survey, Washington, D. C., 20242.

Water resources as a whole

Bordne, E. F., 1960, Water resources of a western New York region, a case study of water resources and use in the Genesee Valley and western Lake Ontario basin: Syracuse, N. Y., Syracuse Univ. Press, 149 p.

*Fairchild, H. L., 1935, Genesee Valley hydrography and drainage: Rochester Acad. of Sci. Proc., v. 7, no. 6, p. 157-188.

*Grossman, I. G., and Yarger, L. B., 1953, Water resources of the Rochester area, N. Y.: U.S. Geol. Survey Circ. 246, 30 p.

*(U.S.) New England-New York Inter-Agency Committee, 1955, The resources of the New England-New York region, Part 2, chapter 33, Genesee River basin, N. Y.-Pa.: Boston, Mass., New England-New York Inter-Agency Comm., 299 p.

Streamflow, runoff, and floods

*Fisher, E. A., Covas, P. A., and Freeman, J. R., 1937, Report of a study of flood conditions in the Genesee River, having specific relation to a civic center, also to the general subject of flood protection for the city of Rochester: Rochester, N. Y., Rochester Dept. of Public Works, 251 p.

Hoyt, W. G., and Langbein, W. B., 1955, Floods: Princeton, N. J., Princeton Univ. Press, 469 p.

Knox, C. E., and Nordenson, T. J., 1955, Average annual runoff and precipitation in the New England-New York area: U.S. Geol. Survey Hydrol. Inv. Atlas HA-7, 6 p.

*Langbein, W. B., and others, 1947, Major winter and nonwinter floods in selected basins in New York and Pennsylvania: U.S. Geol. Survey Water-Supply Paper 915, 139 p. (Hydrology of flood of March 1920 in the upper Genesee River basin is described on pages 70-80.)

Monroe County Planning Council, 1962 and 1964, Drainage study, stages 1 and 2, Rochester-Monroe County metropolitan area: Rochester, N. Y., Monroe County Plan. Council, 141 and 117 p.

Rafter, G. W., 1905, Hydrology of the State of New York: New York State Mus. Bull. 85, 902 p.

Robison, F. L., 1961, Floods in New York, magnitude and frequency: U.S. Geol. Survey Circ. 454, 10 p. (A related report, also including the Genesee River basin, is now in press -- Magnitude and frequency of floods in the United States, Part 4, St. Lawrence River basin: U.S. Geol. Survey Water-Supply Paper 1677.)

Robison, F. L., 1965, Maximum known discharges of New York streams: New York State Water Resources Comm. Bull. 54, 40 p.

*U.S. Army, Corps of Engineers, 1944, Report on the Genesee River, N. Y.: 78th Cong., 2d sess., House Doc. 615, 35 p.

*_____ 1948, Genesee River in the vicinity of Dansville, N. Y.: 80th Cong., 1st sess., House Doc. 206, 36 p.

*_____ 1949, Genesee River, vicinity of Wellsville, Allegany County, and Caledonia, N. Y.: 81st Cong., 1st sess., House Doc. 232, 35 p.

U.S. Geological Survey, 1958, Compilation of records of surface waters of the United States through September 1950, Part 4, St. Lawrence River basin: U.S. Geol. Survey Water-Supply Paper 1307, 397 p. (includes Genesee River basin on pages 267-286).

_____ 1961, Surface water supply of the United States, Part 4, St. Lawrence River basin, 1960: U.S. Geol. Survey Water-Supply Paper 1707, 437 p. (This is the last of a long series of annual river-basin reports on streamflow and stage and contents of reservoirs. Tables on preceding pages contain numbers of earlier reports in this series. For more recent reports containing similar types of information by States, see next item below.)

_____ 1964, Surface water records of New York, 1963: U.S. Geol. Survey open-file rept., 369 p. (This is one of an annual series of reports, beginning in 1961; in the tables on the preceding pages these reports are identified by the letters "S.R." for "Statewide report." The 1963 report contains data for the Genesee River basin on pages 229-244.)

U.S. Geological Survey, 1964, Compilation of records of surface waters of the United States, October 1950 to September 1960, Part 4, St. Lawrence River basin: U.S. Geol. Survey Water-Supply Paper 1727, 379 p.

Chemical quality and temperature of streams

Pauszek, F. H., 1959, Chemical quality of surface waters in the Allegheny, Genesee, and Susquehanna River basins, New York, 1953-1956: New York State Dept. of Commerce Bull. 3, 94 p.

U.S. Geological Survey, 1964, Quality of surface waters of the United States, Parts 3 and 4, Ohio River basin and St. Lawrence River basin, 1962: U.S. Geol. Survey Water-Supply Paper 1942, 322 p. (This is the most recently published of an annual series of reports on chemical quality and temperature of streams.)

Water-pollution surveys of streams

*New York State Department of Health, 1955, Lower Genesee River drainage basin: New York State Dept. of Health, Water Pollution Control Board, Genesee River Basin Survey Ser. Rept. no. 1, 43 p.

_____ 1961, Upper Genesee River drainage basin: New York State Dept. of Health, Water Pollution Control Board, Genesee River Basin Survey Ser. Rept. no. 2, 219 p.

Ground water and geology, including soil surveys

Boardman, Leona, 1952, Geologic map index of New York: U.S. Geol. Survey map (scale 1:750,000).

Broughton, J. G., and others, 1962, The geology of New York State: New York State Mus., Map and Chart Ser. no. 5, 10 sheets (map of bedrock geology in 5 quadrangle sheets, scale 1:250,000).

Cline, M. G., 1961, Soils and soil associations of New York, revised: New York College of Agriculture, Cornell Ext. Bull. 930, 63 p.

Denny, C. S., 1956, Surficial geology and geomorphology of Potter County, Pa.: U.S. Geol. Survey Prof. Paper 288, 72 p.

Denny, C. S., and Lyford, W. H., 1963, Surficial geology and soils of the Elmira-Williamsport region, New York and Pennsylvania: U.S. Geol. Survey Prof. Paper 379, 60 p. (Contains as plate 3, "Reconnaissance map of Wisconsin glacial geology of south-central New York and northeastern Pennsylvania," scale 1:500,000.)

*Fairchild, H. L., 1909, Glacial waters in central New York: New York State Mus. Bull. 127, 66 p.

*_____ 1926, The Dansville Valley and drainage history of western New York: Rochester Acad. of Sci. Proc., v. 6, no. 7, p. 217-242.

*_____ 1928, Geologic story of the Genesee Valley and drainage history of western New York: Rochester, N. Y., 215 p. (Published by the late Prof. Fairchild; a reprint of articles published in The Gas and Electric News, Rochester, N. Y., July 1926 to July 1928.)

*_____ 1932, New York moraines: Geol. Soc. of America Bull., v. 43 (Sept.), p. 627-662.

Heath, R. C., 1964, Ground water in New York: New York Water Resources Comm. Bull. GW-51, 1 sheet (folder).

*Leggette, R. M., Gould, L. O., and Dollen, B. H., 1935, Ground-water resources of Monroe County, N. Y.: Rochester, N. Y., Monroe County Regional Plan. Board, 187 p.

*Lewis, H. G., and others, 1927, Soil survey of Genesee County, N. Y.: U.S. Dept. of Agriculture, Soil Survey ser. 1922, p. 1595-1648.

Lohman, S. W., 1939, Ground water in north-central Pennsylvania: Pennsylvania Topographic and Geol. Survey Bull. W 6, 219 p.

Mack, F. K., and Digman, R. E., 1962, The ground-water resources of Ontario County, N. Y.: New York Water Resources Comm. Bull. GW-48, 99 p.

*Muller, E. H., 1957, Physiography and glacial geology of Allegany County, N. Y., and vicinity, p. 4-10, in Guidebook for geology of southwest tier: Wellsville, N. Y., New York State Geol. Assoc. (29th Ann. Mtg., May 9-12, 1957), 66 p.

Pearson, C. S., and Cline, M. G., 1956, Soil survey of Allegany County, N. Y.: U.S. Dept. of Agriculture, Soil Survey ser. 1942, no. 12, 141 p.

_____ 1958, Soil survey of Ontario and Yates Counties, N. Y.: U.S. Dept. of Agriculture, Soil Survey ser. 1949, no. 5, 126 p.

*Pearson, C. S., and others, 1934, Soil survey of Steuben County, N. Y.: U.S. Dept. of Agriculture, Soil Survey ser. 1931, no. 2, 62 p.

*_____ 1938, Soil survey of Wyoming County, N. Y.: U.S. Dept. of Agriculture, Soil Survey ser. 1933, no. 16, 45 p.

_____ 1940, Soil survey of Cattaraugus County, N. Y.: U.S. Dept. of Agriculture, Soil Survey ser. 1935, no. 12, 65 p.

_____ 1956, Soil survey of Livingston County, N. Y.: U.S. Dept. of Agriculture, Soil Survey ser. 1941, no. 15, 120 p.

Sweet, A. T., and others, 1938, Soil survey of Monroe County, N. Y.: U.S. Dept. of Agriculture, Soil Survey ser. 1933, no. 17, 67 p.

U.S. Geological Survey, 1965, Ground-water levels in the United States 1958-62, northeastern states: U.S. Geol. Survey Water-Supply Paper 1782, 252 p.

Previous publications in this series which contain water-level data (by calendar years) for 2 or 3 wells in the Genesee River basin are as follows:

Water-Supply Paper	Year of water-level data	Water-Supply Paper	Year of water-level data
* 944	1942	1156	1949
* 986	1943	1165	1950
*1016	1944	1191	1951
*1023	1945	1221	1952
*1071	1946	*1265	1953
*1096	1947	1321	1954
1126	1948	1404	1955
		1537	1956, 1957

*University of Rochester, Department of Geology and Geography, 1956, Guidebook for field trips in western New York: Rochester, N. Y., New York State Geol. Assoc. (28th Ann. Mtg., May 4-6, 1956), 121 p.

Von Engeln, O. D., 1961, The Finger Lakes region, its origin and nature: Ithaca, N. Y., Cornell Univ. Press, 156 p.

Public water supplies

New York State Department of Health, 1960, Public water supply data: New York State Dept. of Health Bull. 19, 186 p.

*New York State Office for Local Government, 1962, Study of needs for sewage works, report no. 5, November 1962, County map series - Vol. 1 (water and sewer service areas): New York State Dept. of Health, 132 p. (Western and central New York).

U.S. Public Health Service, 1964, Municipal water facilities, 1963 inventory, region 2 (Del., N. J., N. Y., Pa.): U.S. Public Health Service Pub. 775, v. 2, 168 p. (Most recent in this series of inventory reports issued at 5-year intervals.)